SONY

PROFESSIONAL DISC RECORDER

PDW-F70
PDW-F30
PDW-70MD

NETWORK BOARD
PDBK-101

TS INPUT/OUTPUT BOARD
PDBK-102

ANALOG HD INPUT BOARD
PDBK-103

SD INPUT UPCONVERTER BOARD
PDBK-104

XDCAM HD
Professional Disc System
Professional Disc

MPEG HD i CINEALTA

SERVICE MANUAL
Volume 1 1st Edition (Revised 2)

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

設置や保守，点検，修理などを行う前に，別冊のオペレーションマニュアルの「安全のために」を必ずお読みください。

⚠WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠ AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l’entretien. Afin de réduire les risques de décharge électrique, d’incendie ou de blessure n’effectuer que les réparations indiquées dans le mode d’emploi à moins d’être qualifié pour en effectuer d’autres. Pour toute réparation faire appel à une personne compétente uniquement.

For safety, do not connect the connector for peripheral device wiring that might have excessive voltage to the following port(s).
: NETRWORK connector (PDBK-101)
Follow the instructions for the above port(s).

PDW-F70 (SY)	Serial No. 10001 and Higher
PDW-F70 (CN)	Serial No. 50001 and Higher
PDW-F30 (SY)	Serial No. 10001 and Higher
PDW-F30 (CN)	Serial No. 50001 and Higher
PDW-70MD (SY)	Serial No. 10001 and Higher
PDBK-101 (SY)	Serial No. 10001 and Higher
PDBK-102 (SY)	Serial No. 10001 and Higher
PDBK-103 (SY)	Serial No. 10001 and Higher
PDBK-104 (SY)	Serial No. 10001 and Higher

注意

指定以外の電池に交換すると，破裂する危険があります。
使用済の電池は，説明書に従って処理してください。

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

Vorsicht!

Explosionsgefahr bei unsachgemäßem Austausch der Batterie.

Ersatz nur durch denselben oder einen vom Hersteller empfohlenen ähnlichen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.
Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

ADVARSEL!

Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

ADVARSEL

Lithiumbatteri - Eksplosjonsfare.
Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverandøren.

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en likvärdig typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt gällande föreskrifter.

VAROITUS

Paristo voi räjähtää jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

Laser Diode Properties
Wavelength : 403 to 410 nm
Emission duration : Continuous
Laser output power : 65 mW (max. of pulse peak), 35 mW (max. of CW)

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

CAUTION

The use of optical instruments with this product will increase eye hazard.

CLASS 1 LASER PRODUCT
LASER KLASSE 1 PRODUKT
LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

This Professional Disc Recorder is classified as a CLASS 1 LASER PRODUCT.
The CLASS 1 LASER PRODUCT label is located on the top panel.

CAUTION	LASER RADIATION WHEN OPEN. DO NOT STARE INTO BEAM.
For U.S.A.	
CAUTION	CLASS 1M LASER RADIATION WHEN OPEN. DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS.
ATTENTION	RADIATIONS LASER DE CLASSE 1M EN CAS D'OUVERTURE. NE PAS REGARDER DIRECTEMENT AVEC DES INSTRUMENTS OPTIQUES.
VORSICHT	KLASSE 1M-LASERSTRAHLUNG WENN GEÖFFNET. NICHT BLICKEN DIREKT MIT OPTISCHEN INSTRUMENTEN.
ADVARSEL	LASERSTRÅLING AF KLASSE 1M VED ÅBNING. SE IKKE DIREKTE MED OPTISKE INSTRUMENTER.
ADVARSEL	LASERSTRÅLING I KLASSE 1M NÅR DEKSEL ÅPNES. SE IKKE DIREKTE MED OPTISKE INSTRUMENTER.
VARNING	KLASS 1M:LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD. BETRAKTA EJ STRÅLEN MED OPTISKA INSTRUMENT.
VARO!	AVATTUNA LUOKAN 1M LASERSÄTEILYÄ. ÄLÄ KATSO SITÄ SUORAAN OPTISEN LAITTEEN LÄPI.
For EUROPE	

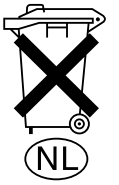
This label is located on the top panel of the drive unit.

GEFAHR

Bei geöffnetem Laufwerk und beschädigter oder deaktivierter Verriegelung tritt ein unsichtbarer Laserstrahl aus. Direkter Kontakt mit dem Laserstrahl ist unbedingt zu vermeiden.

Voor de klanten in Nederland

Gooi de batterij niet weg maar lever deze in als klein chemisch afval (KCA).



Für Kunden in Deutschland

Entsorgungshinweis: Bitte werfen Sie nur entladene Batterien in die Sammelboxen beim Handel oder den Kommunen. Entladen sind Batterien in der Regel dann, wenn das Gerät abschaltet und signalisiert “Batterie leer” oder nach längerer Gebrauchsdauer der Batterien “nicht mehr einwandfrei funktioniert”. Um sicherzugehen, kleben Sie die Batteriepole z.B. mit einem Klebestreifen ab oder geben Sie die Batterien einzeln in einen Plastikbeutel.

For the customers in Taiwan only

廢電池請回收

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Manual Structure

Purpose of this manual

This manual is the Service manual volume 1 of the Professional Disc Recorder PDW-F70/F30/70MD.

This maintenance manual (Volume 1, 2) is intended for use by trained system and service engineers, and provides the information of maintenance and detailed service (parts replacement, guideline for adjustment, schematic diagrams, board layouts, detailed parts list).

This manual (volume 1) explains about maintenance information, parts replacement, and guideline for adjustment.

Note

Figures for PDW-F70 are used in this manual unless otherwise specified.

Related manuals

Besides this “Service manual Volume 1”, the following manuals are available.

- **Operating Instructions (Supplied with this unit.)**
  This manual is necessary for application and operation (and installation) of this unit.

- **Protocol Manual of Remote (9-pin) Connector (Available on request)**
  This manual explains the protocol for controlling the VTR via the RS-422A (9-pin serial remote). If this manual is required, please contact your local Sony Sales Office/Service Center.

- **Protocol Manual (Available on request)**
  This manual explains the protocol for controlling the VTR via the RS-232C. If this manual is required, please contact your local Sony Sales Office/Service Center.

- **Service Manual Volume 2 (Available on request)**
  This manual is intended for use by trained system and service engineers, and describes schematic diagrams, board layouts and detailed parts list required for parts-level service.
  Part number: 9-968-228-XX

- **“Semiconductor Pin Assignments” CD-ROM (Available on request)**
  This “Semiconductor Pin Assignments” CD-ROM allows you to search for semiconductors used in Broadcast and Professional equipment.
  This manual contains a complete list of semiconductors and their ID Nos., and thus should be used together with the CD-ROM.
  Part number: 9-968-546-XX

Trademarks

Trademarks and registered trademarks used in this manual are follows.

• Ethernet is a registered trademark of Xerox Corporation.

Section 1
Service Overview

1-1. Operating Conditions

CAUTION

Good air circulation is essential to prevent internal heat build-up. Place the unit in location with sufficient air circulation.
Do not block the ventilation holes of the cabinet and the front and rear panels.

Operating temperature: 5 ˚C to 40 ˚C
Operating humidity: 25 % to 80 % (non-condensing)
Storage temperature: −20 ˚C to 60 ˚C
Locations to avoid:

- Areas where the unit will be exposed to direct sunlight of any other strong lights.
- Areas near heat sources.
- Dusty areas or areas subject to vibration.
- Areas with strong magnetic field.
- Areas with much electrical noise.
- Areas with much static electricity.
- Areas that is impossible to find a specified room for installation.
- Areas windtight.

Tilt allowance: Within 30˚ (Do not slant the front and rear of the unit more than 30˚.)

CAUTION

Fix the unit securely to avoid drop when the unit is operated at not-horizontal place.

1-2. Power Supply

1-2-1. Voltage and Power Requirements

This unit's power line has a switching regulator.

CAUTION

Be sure to operate the unit within the range of following power voltage.

Power voltage: AC 100 to 240 V ±10 %
Power frequency: 50 Hz or 60 Hz
Power consumption: 70 W
Rush current: 15 A (power voltage 100 V)
45 A (power voltage 240 V)

Note

AC power supply is required a capacity which is commensurate with rush current.
If the capacity of the AC power supply is not enough, the breaker of AC power of a supply side may operate or this unit may not operate normally.

1-2-2. Recommeded Power Cord

This unit does not come with a power cord.
To get a power cord, please contact your local Sony Sales Office/Service Center.

WARNING

- Use the approved Power Cord (3-core mains lead)/ Appliance Connector/Plug with earthing-contacts that conforms to the safety regulations of each country if applicable.
- Use the Power Cord (3-core mains lead)/Appliance Connector/Plug conforming to the proper ratings (Voltage, Ampere).

If you have questions on the use of the above Power Cord/ Appliance Connector/Plug, please contact your local Sony Sales Office/Service Center.

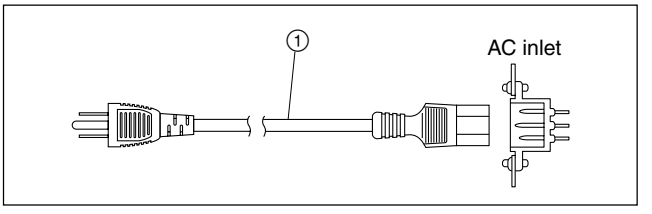
WARNING

- Never use an injured power cord.

For customers in the U.S.A. and Canada:

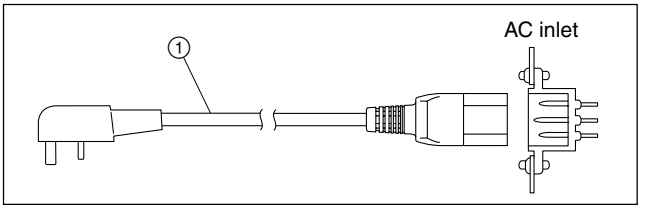
① Power cord 125 V 10 A (2.4 m): ⚠1-551-812-41 (PDW-F70/F30)

① Power cord 125 V 13 A (2.4 m): ⚠1-556-813-31 (PDW-70MD)



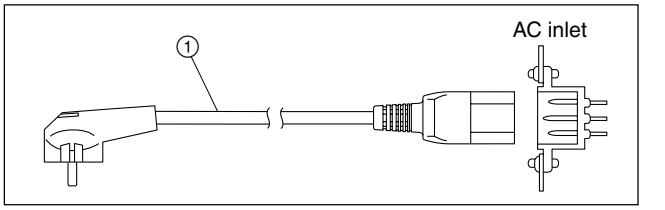
For customers in United Kingdom:

① Power cord 250 V 10 A (2.0 m): ⚠1-777-823-12



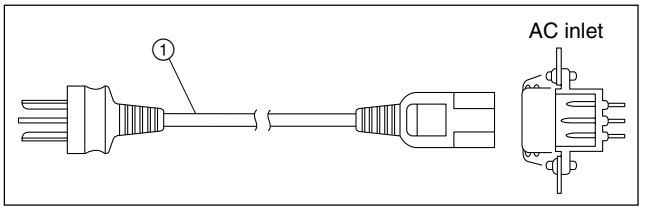
For customers in European countries except the United Kingdom:

① Power cord 250 V 10 A (2.0 m): ⚠1-551-631-61



For customers in the China:

① Power cord 250 V 10 A (1.8 m): ⚠1-783-481-42



If the unit is used in the area except above, please contact your local Sony Sales Office/Service Center.

1-3. Supplied Accessories

1-3-1. PDW-F70/F30/70MD

- Vertical installation stand 2
- Infrared remote commander 1
- Ferrite core (PDW-F70/70MD) 1
- Operating instructions
  - Japanese version 1
  - English version 1
  - CD-ROM manual (PDW-F70/F30) 1
  - or CD-ROM manual (PDW-70MD) 1
- Proxy Browsing Software PDZ-1 1
- Warranty booklet 1
- Sales companies guide (PDW-70MD) 1

1-3-2. PDBK-101

- Screw PSW3 × 8 3
- Installation instructions 1

1-3-3. PDBK-102

- Screw PSW3 × 8 4
- Installation instructions 1

1-3-4. PDBK-103

- Option panel assembly 1
- Coaxial cable 4
- Screw
  - B3 × 5 4
  - PSW3 × 8 4
- Installation instructions 1

1-3-5. PDBK-104

- Option panel assembly 1
- Coaxial cable 2
- Screw
  - B3 × 5 4
  - PSW3 × 8 4
- Installation instructions 1

1-4. Matching Connectors and Cables

When external cables are connected to the connector of this unit, the hardware listed below (or equivalents) must be used.

Panel indication	Matching connector (cable)	
	Name	**Sony part No.**
REF VIDEO INPUT COMPOSITE INPUT (OPTION) COMPOSITE OUT SDSDI OUTPUT DIGITAL AUDIO (AES/EBU) TIME CODE HD INPUT (OPTION) SDSDI INPUT (OPTION)	BNC *1	1-569-370-12
HD SDI INPUT HD SDI OUTPUT	BNC *2	1-569-370-12
MONITOR	D-sub 15P	—
COMPOSITE OUT AUDIO MONITOR	pin plug	—
AUDIO INPUT	XLR 3P, MALE	1-508-084-00
AUDIO OUTPUT	XLR 3P, FEMALE	1-508-083-00
CONTROL	mini plug	—
RS232C	D-sub 9P, FEMALE	
REMOTE (9P)	9P remote control cable (RCC-G series) or D-sub 9P, MALE or JUNCTION SHELL 9P	— 1-569-370-12 1-561-749-00
(NETWORK) (OPTION)	RJ-45 8P 1000BASE-T standard conformity article (UTP cable is recommended. (UTP: Unshielded Twist Pair))	—
S400 (i.LINK)	IEEE1394 6P VMC-IL6615B (1.5 m) VMC-IL6635B (3.5 m)	 — —
PHONES *3	JM-60 stereo phone plug	—

*1: It is recommended to connect the BELDEN 8281 cable or equivalent to this connector.
*2: It is recommended to connect the BELDEN 1694A cable or equivalent to this connector.
*3: It is in the front panel.

1-5. Signal Inputs and Outputs

Input (PDW-F70/70MD only)

HD SDI INPUT: BNC × 1
HD serial digital interface
SMPTE 292M

REF VIDEO INPUT: BNC × 2 (Loop through output)
External reference video signal
HD tri-level sync, or SD composite sync (0.3 V p-p, 75 Ω, sync negative)

HD COMPONENT VIDEO INPUT: BNC × 4
(Option PDBK-103 is installed)
Analog HD (1080) component video
SMPTE 274M
Y/G, Pb/B, Pr/R: 0.7 V p-p, 75 Ω
SYNC: HD tri-level sync, or External composite sync
0.6 V p-p, 75 Ω

SD SDI INPUT: BNC × 1
(Option PDBK-104 is installed)
SD seirial degital interface
SMPTE 292M

COMPOSITE INPUT: BNC × 1
(Option PDBK-104 is installed)
Analog composite video
1.0 V p-p, 75 Ω, negative

AUDIO INPUT CH-1/CH-3, CH-2/CH-4:
XLR 3-pin (Female × 2)
Analog audio
+4/0/−3/−6 dBu (Selectable), 10 kΩ, balanced

DIGITAL AUDIO (AES/EBU) INPUT CH-1/CH-2, CH-3/CH-4: BNC × 2
AES/EBU digital audio
AES-3id-1995

TIME CODE IN: BNC × 1
SMPTE time cede
0.5 to 18 V p-p, 3.3 kΩ, unbalanced

Output

HD SDI OUTPUT: BNC × 2
(PDW-F70/70MD only)
HD serial digital interface
SMPTE 292M

SD SDI OUTPUT: BNC × 1
(PDW-F70/70MD only)
SD serial digital interface
SMPTE 259M

COMPOSITE OUT: BNC × 1, RCA pin jack × 1
Analog composite video
1.0 V p-p, 75 Ω, sync negative

AUDIO OUTPUT CH-1/CH-3, CH-2/CH-4:
XLR 3-pin (Male × 2)
Analog audio
+4/0/−3/−6 dBu (Selectable), 600 Ω, balanced

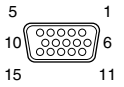
AUDIO MONITOR: Pin jack × 2
Analog audio
−∞ to +1 dBu, 47 kΩ, unbalanced, L/R/L + R Selectable

PHONES: Stereo standard jack × 1
Analog audio
−∞ to −14 dBu, 8 Ω, unbalanced

DIGITAL AUDIO (AES/EBU) OUTPUT CH-1/CH-2, CH-3/CH-4: BNC × 2
(PDW-F70/70MD only)
AES/EBU digital audio
AES-3id-1995

TIME CODE OUT: BNC × 1
(PDW-F70/70MD only)
SMPTE time cede
2.2 V p-p ±3.0 dB, 600 Ω, unbalanced

MONITOR OUT: D-sub 15-pin (Female)



(External view)

Pin No.	Signal
1	R_VIDEO, R-Y_VIDEO
2	G_VIDEO, Y_VIDEO
3	B_VIDEO, B-Y_VIDEO
4	GND
5	GND
6	R_RET(G)
7	G_RET(G)
8	B_RET(G)
9	NC
10	SYNC_RET (GND)
11	GND
12	NC
13	H_SYNC
14	V_SYNC
15	NC

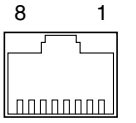
Control

S400 (i.LINK): 6-pin × 1
IEEE1394

CONTROL : Mini-jack 4-pole × 1
(PDW-F70/70MD only)
For remote control unit RM-LG2

NETWORK: RJ-45 8-pin modular jack

(Option PDBK-104 is installed)
10BASE-T (Conform to IEEE802.3i)
100BASE-TX (Conform to IEEE802.3u)
1000BASE-T (Conform to IEEE802.3ab)

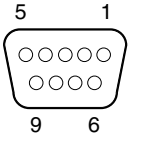


(External view)

Pin No.	Signal
1	BI DA+ (Input/Output)
2	BI DA– (Input/Output)
3	BI DB+ (Input/Output)
4	BI DC+ (Input/Output)
5	BI DC– (Input/Output)
6	BI DB– (Input/Output)
7	BI DD+ (Input/Output)
8	BI DD– (Input/Output)

REMOTE (9P): D-sub 9-pin (Female)

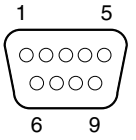
RS-422A



(External view)

Pin No.	Signal
1	GND
2	RM_TX_(–) (Output)
3	RM_RX_(+) (Input)
4	GND
5	PRIORITY (Input/Output)
6	GND
7	RM_TX_(+) (Output)
8	RM_RX_(–) (Input)
9	GND

RS232C: D-sub 9-pin (Male)



(External view)

Pin No.	Signal
1	DCD: Data Carrier Detect (Input)
2	RX: Received Data (Input)
3	TX: Transmitted Data (Output)
4	DTR: Data Terminal Ready (Output)
5	SG: Signal Ground
6	DSR: Data Set Ready (Input)
7	RTS: Request to Send (Output)
8	CTS: Clear to Send (Input)
9	NC

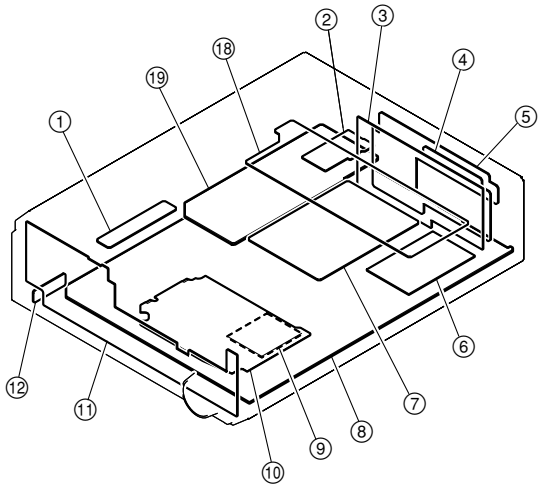
1-6. Circuit Function

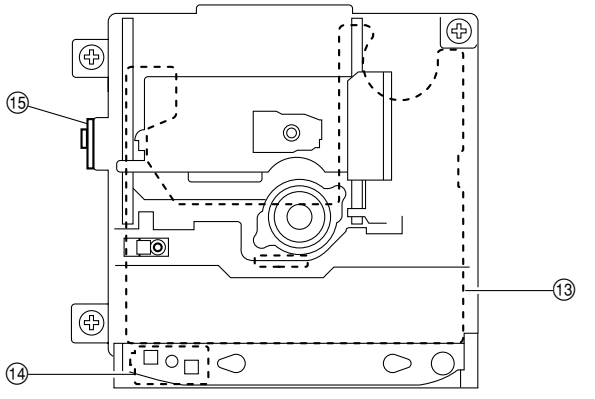
System configuration	Board name	Circuit function	Location No.
Digital process	DPR-270/A	Audio/Video/Core process/Host	⑧
and	ENC-101	MPEG encode	⑨
Video process	VP-60/A	REF/Composite/TC/AES I/O	⑤
Audio process	APR-75/A	Audio process	③
	AU-301/A	Analog audio I/O	④
	HP-130	Headphone connector	⑫
HDSDI module	RX-93A/B	HDSDI module	⑥
Control panel	KY-580/A/B	Control panel (LCD/SW/JOG/SHUTTLE)	⑪
Other	EM-5	Electric double layer cap	①
	MS-80	Memory stick connector	②
Drive unit/	DR-550G	Drive main board	⑩
Sensor	HN-300G	Mecha sensor connection board	⑬
	SE-709	Loading position sensor board	⑰
	SE-800	Acceleration sensor board	⑮
	SW-1124G	Cartridge sensor SW board	⑭
	SW-1125G	Cartridge sensor SW board	⑯
Power supply	PS-688	Power supply (AC/DC)	⑱
Option	ADC-50 (PDBK-103)	Analog HD input	⑦
	ADC-50S (PDBK-104)	SD input upconverter	⑦
	NET-1 (PDBK-101)	Network	⑲
	TSI-54 (PDBK-102)	TS input/output	⑦

1-7. Location of Main Parts

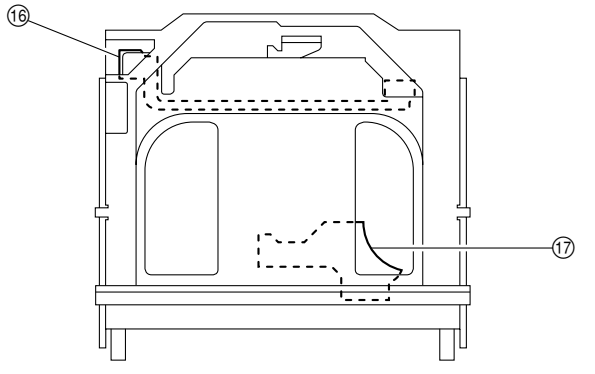
1-7-1. Printed Circuit Boards

ADC-50 (PDBK-103) ..... ⑦
ADC-50S (PDBK-104) ..... ⑦
APR-75/A ..... ③
AU-301/A ..... ④
DPR-270/A ..... ⑧
DR-550G ..... ⑩
EM-5 ..... ①
ENC-101 ..... ⑨
HN-300G ..... ⑬
HP-130 ..... ⑫
KY-580/A/B ..... ⑪
MS-80 ..... ②
NET-1 (PDBK-101) ..... ⑲
PS-688 ..... ⑱
RX-93A/B ..... ⑥
SE-709 ..... ⑰
SE-800 ..... ⑮
SW-1124G ..... ⑭
SW-1125G ..... ⑯
TSI-54 (PDBK-102) ..... ⑦
VP-60/A ..... ⑤



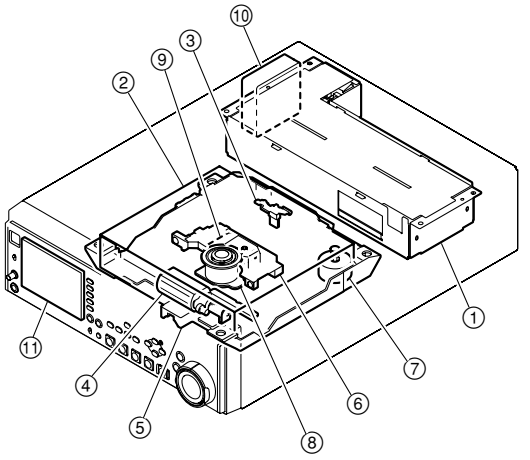


<Drive top view>



<Loader top view>

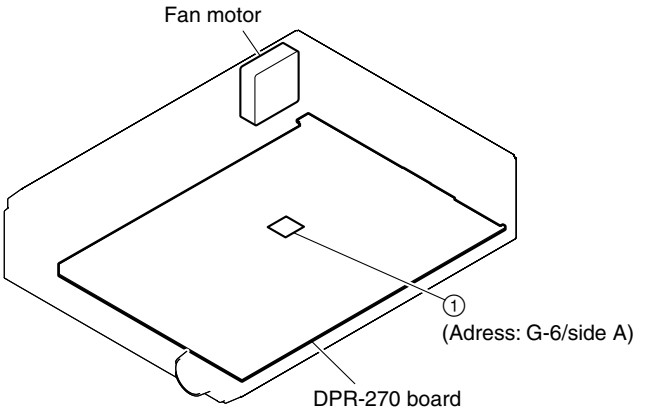
1-7-2. Main Mechanical Part Locations

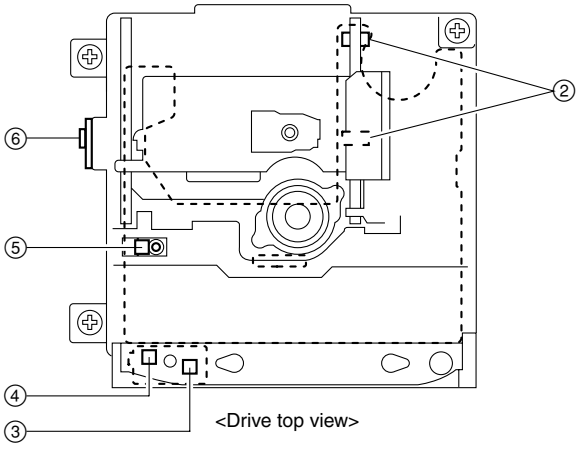


INDEX

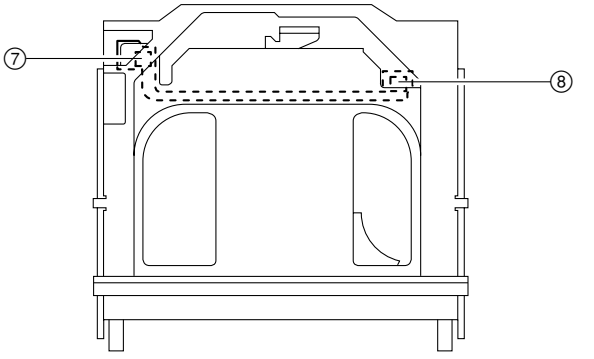
① Power supply unit
② Loarder (P1) assembly
③ Cleaner (P1) assembly
④ Loarding motor (P1) assembly
⑤ Drive (P10) sub assembly
⑥ Optical block assembly
⑦ Seek motor (P10) assembly
⑧ Spindle motor
⑨ Fan motor (drive)
⑩ Fan motor (side)
⑪ LCD backlight

1-8. Function and Location of Sensors





<Drive top view>



<Loder top view>

No.	Name	Function
①	Temperature sensor	IC3008 on the DPR-270 board, Control of the fan motor.
②	OP position sensor	Detects a position of the Optical block assembly.
③	REC INH sensor	Detects a status of the write-inhibited tab of a cartridge.
④	Cartridge down sensor	Detects the cartridge down.
⑤	Condensation sensor	Detects condensation.
⑥	Acceleration sensor	Detects acceleration added to the optical drive.
⑦	Cartridge in sensor	Loader position sensor
⑧	STBY OFF sensor	Loader position sensor

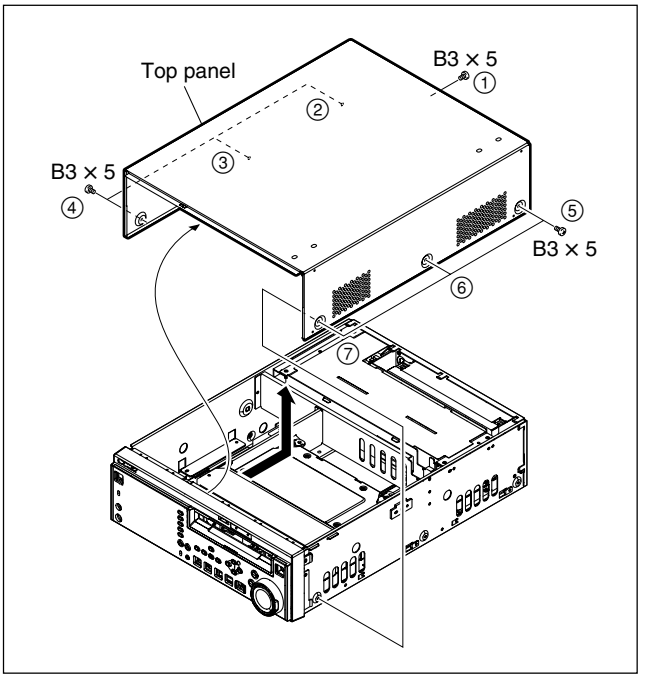
1-9. Removing/Reattaching Cabinet

1-9-1. Removing/Reattaching Top Panel

1. Turn off the unit.
2. Remove the seven screws and remove the top panel in the arrow direction.

   Note

   When reattaching the top panel, tighten the screws in the numerical order below.



3. Reinstall the top panel by reversing the steps of removal.

1-9-2. Removing/Reattaching Front Panel Assembly

1. Remove the top panel. (Refer to Section 1-9-1.)
2. Disconnect the harness from CN113, and the flexible card wire from CN106.

   Notes

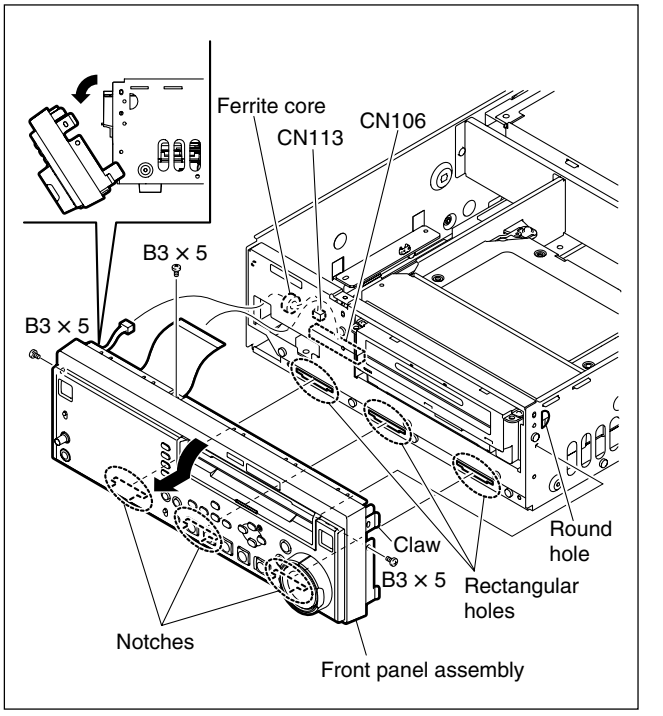
   - Be very careful not to fold the flexible card wire. The life of the flexible card wire will be significantly shortened if it is folded.
   - When connecting the harness, pass it through the ferrite core.

3. Remove the three screws.
4. Release the claws from the round holes with a screwdriver or the like.

   Note

   Be careful not to scratch the unit.

5. Remove the front panel assembly while disengaging the notches from the rectangular holes.



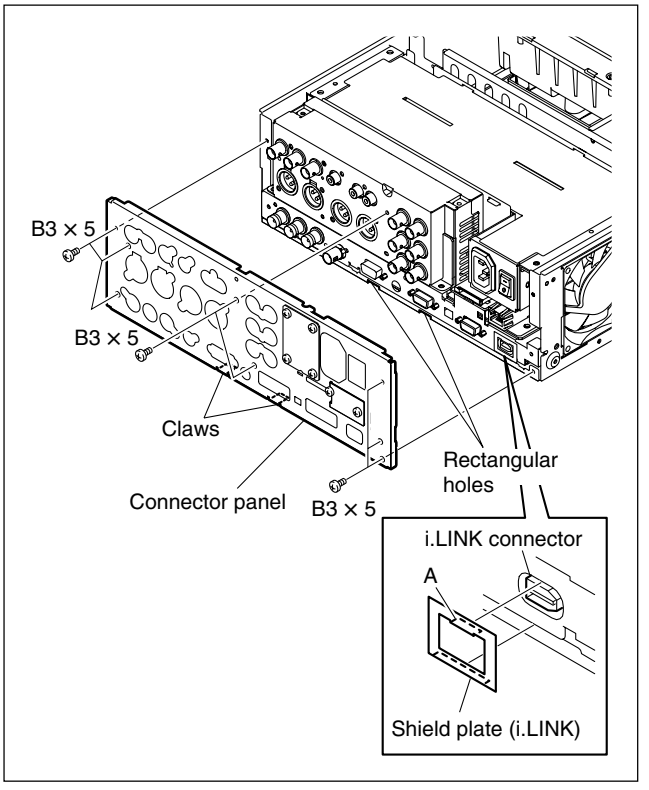
6. Reinstall the front panel assembly by reversing steps 1 to 5 of removal.

1-9-3. Removing/Reattaching Connector Panel

1. Remove the top panel. (Refer to Section 1-9-1.)
2. Remove the eight screws to detach the connector panel.

Notes

- When the connector on PDW-F70MD is coverd, remove the connector cover before removing the connector panel.(Refer to the Operating Instructions.)
- Be careful not to detach the shield plate (i.LINK). It the shield plate is detached, attach it while inserting portion A between the i.LINK connector and the chassis.



3. Reattach the connector panel while fitting the claws into the rectangular holes.
4. Tighten the eight screws.
5. Reattach the top panel. (Refer to Section 1-9-1.)

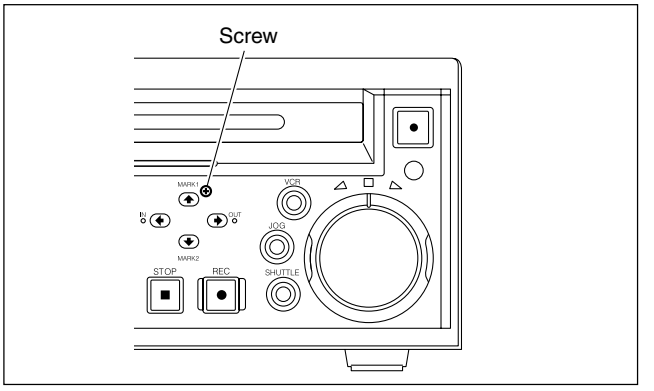
1-10. How to Take Out a Cartridge Manually

If the unit cannot be powered on or the loader assembly does not function, take out a cartridge as follows.

1. Turn the unit power off.
2. Turn the screw counterclockwise while pressing it with a Phillips screwdriver (d = 2.2 mm or less) until the cartridge is ejected.

Notes

- Turn the screw slowly and gently as for as it will go.
- After removing the cartridge, you do not need to return the screw to its original position. Normal operation will resume when the unit is powered on again.



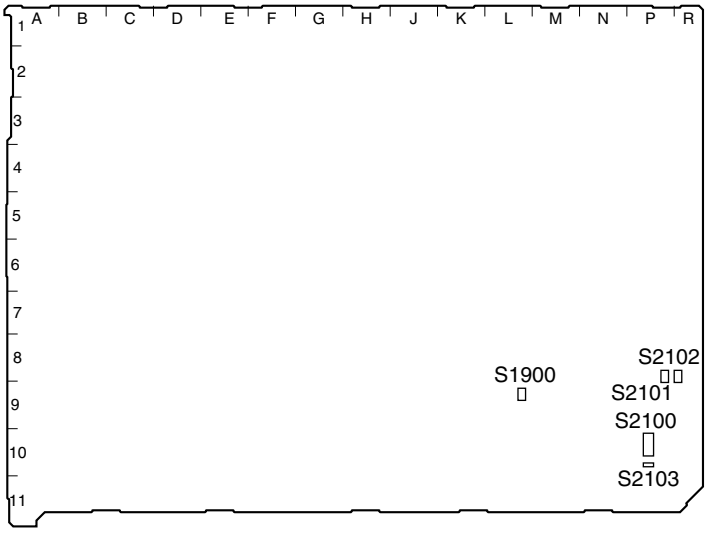
1-11. Switch Settings on the Boards

DPR-270 Board

Notes

Never change the setting of the factory use switches.

The number shown in the parentheses ( ) indicates the address on the circuit board.



DPR-270 board/Side A

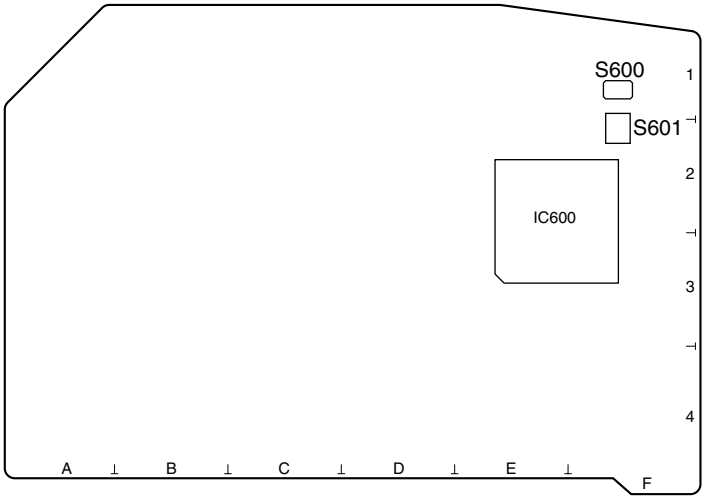
Ref. No.	Bit	Name	Description	Factory setting
S1900 (L-9)	—		Factory use	—
S2100 (P-10)		CPU SW		
	1, 2, 4, 7		Not used	OFF
	3		Factory use	OFF
	6		ON: Starts only the OS and the console. OFF: Normal operation	OFF
	8		ON: Starts by the extarnal ROM device. OFF: Normal operation	OFF
S2101 (P-8)	—	CPU SOFT RESET	Factory use	—
S2102 (R-8)	—	CPU POWER	Factory use	—
S2103 (P-10)	—		Model Select	PDW-F70 PDW-70MD

DR-550G Board

Notes

Never change the setting of the factory use switches.

The number shown in the parentheses ( ) indicates the address on the circuit board.



DR-550G board/Side A

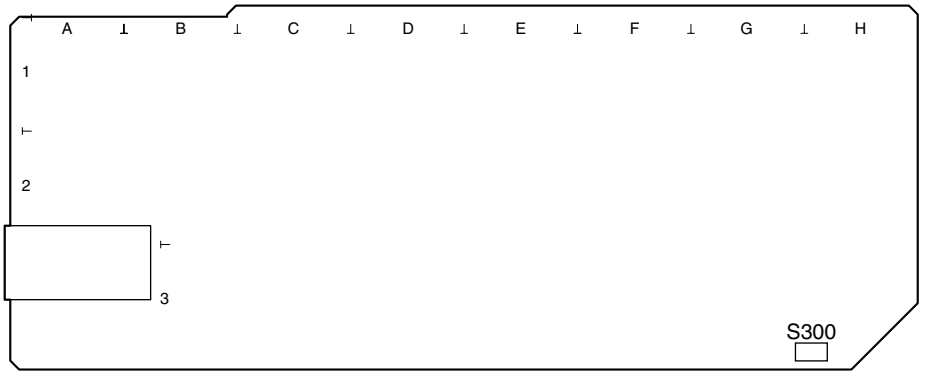
Ref. No.	Bit	Name	Description	Factory setting
S600 (F-1)	—	System reset	Factory use	—
S601 (F-2)		CPU operation	Factory use	
	1, 3, 4			OFF
	2			ON

NET-1 Board

Notes

Never change the setting of the factory use switches.

The number shown in the parentheses ( ) indicates the address on the circuit board.



NET-1 board/Side A

Ref. No.	Bit	Name	Description	Factory setting
S300 (G-3)	—	LINUX SW1	—	—
	1, 5 to 8		Factory use	OFF
	2		ON: Starts by the extarnal ROM device. OFF: Normal operation	OFF
	3		ON: Starts mandatorily in normal mode. OFF: Normal operation	OFF
	4		ON: Starts mandatorily in recovery mode. OFF: Normal operation	OFF

1-12. Circuit-Protection Part List

Circuit Protection Element

This unit is equipped with the positive characteristics thermister(s) (power thermister) as the circuit protection element. The positive characteristics thermister limits the electric current flowing through the circuit as the internal resistance increases when an exces-sive current flows or when the ambient temperature increases.
If the positive characteristics thermister works, turn off the main power of the unit and inspect the internal circuit of this unit. After the cause of the fault is removed, turn on the main power again. The unit works normally.
It takes about one minute to cool down the positive characteristics thermister after the main power is turned off.

Board	Ref. No. (Address)	Part No.
DR-550G	THP500 (F-4/Side B)	⚠ 1-771-075-21
MS-80	THP1 (A-1/Side A)	⚠ 1-803-353-21

Fuse/IC Link

WARNING

The fuse and IC link are essential parts for safe operation. Replace the components with Sony parts whose part numbers appear in the manual published by Sony. If the components are replaced with any parts other than the specified ones, this may cause a fire or electric shock.

This unit is equipped with Fuse(s) and IC link(s).
An excessive current flows due to abnormality inside the equipment, the fuse and/or IC link blow. If they blow, turn off the main power of the equipment, inspect inside of the equipment, and remove the cause of excessive current. After that, replace the fuse and/or IC link.

Board	Ref. No. (Address)	Part No./Name
APR-75	F100* (F-3/Side A)	⚠ 1-576-800-11 Fuse 0.125 A, 250 V
	F700 (A-2/Side A)	⚠ 1-576-325-21 Fuse 0.16 A,125 V
	F701(A-2/Side A)	⚠ 1-576-325-21 Fuse 0.16 A,125 V
DPR-270	F3400 (H-1/Side A)	⚠ 1-576-329-21 Fuse 10 A,125 V
	F3401 (G-1/Side A)	⚠ 1-576-329-21 Fuse 10 A,125 V
KY-580	PS100 (C-3/Side B)	1-533-282-21 IC link 2 A,72 V
	PS101 (C-3/Side B)	1-576-123-21 IC link 0.8 A,72 V
	PS102 (C-3/Side B)	1-576-123-21 IC link 0.8 A,72 V
	PS103 (C-3/Side B)	1-576-123-21 IC link 0.8 A,72 V

*: PDW-F70/70MD only.

1-13. Equipment and Fixtures List for Check/Adjustment

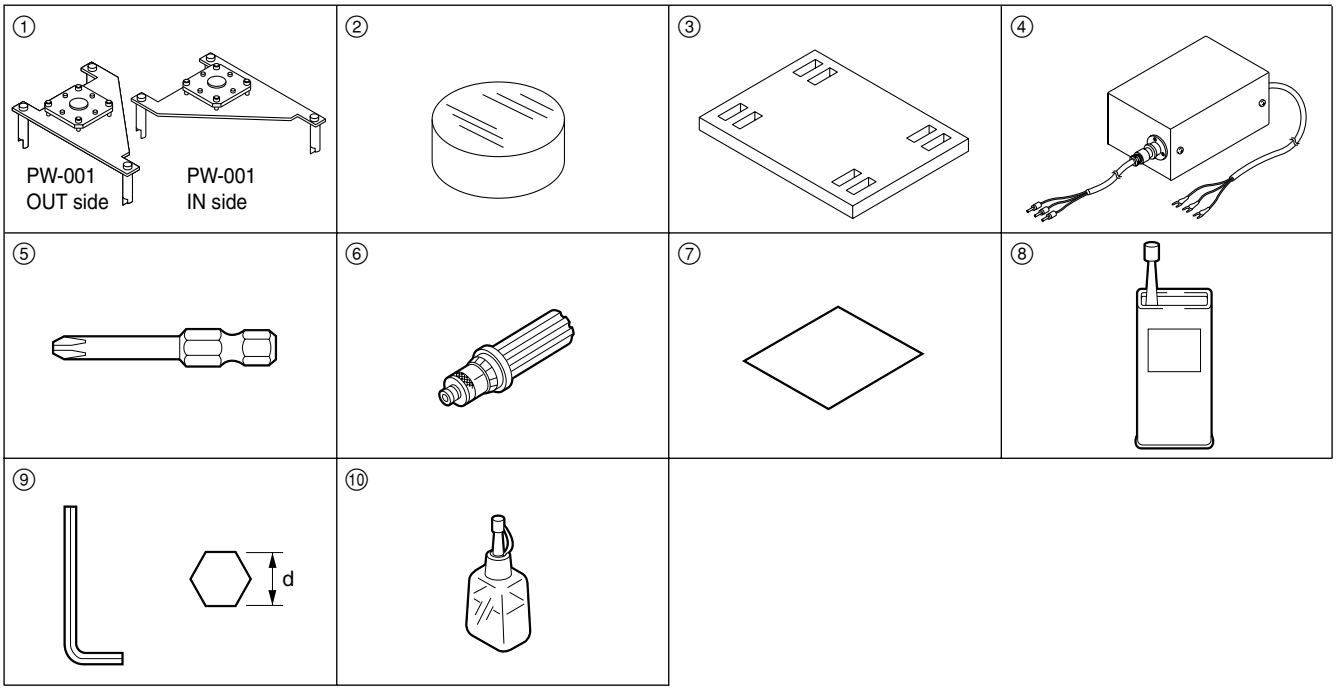
1-13-1. Equipment for Check/Adjustment

It is recommended to use the equipment listed below or the equivalents.
Each equipment listed below is available as a standard product. However, it may not be producted now.

Equipment	Model name	Remarks
Auto-collimator	Nikon 6D	
Oscilloscope	Tektronix TDS3054B or TDS460A	
Frequency counter	Advantest TR5821	
Regulated power supply	—	Output current: More than 10 A
Memory stick	—	For updating the software (Refer to Section 1-23.)

1-13-2. Fixtures

Fig. No.	Part No.	Description	Usage
①	J-6570-010-A	Triangle plates IN/OUT (PW-001)	Skew adjustment
②	J-6570-030-1	BRD-P1/P2 reflection block (PW-003)	
③	J-6570-040-1	Calibration plate	
—	J-6570-050-A	RD adjustment screwdriver (PW-005)	RD adjustment
④	J-6570-060-A	KES-110A E&F LPF box	
—	J-6570-110-A	Alignment disc (PFD23-RS)	Servo adjustment and RD adjustment
⑤	J-6325-110-A	Torque screwdriver's bit (M1.4/M1.7)	Tightening screws
	J-6325-380-A	Torque screwdriver's bit (M2)	
	J-6323-430-A	Torque screwdriver's bit (M3)	
⑥	J-6325-400-A	Torque screwdriver (3 kg•cm) (0.3 N•m)	Tightening screws
	J-6252-510-A	Torque screwdriver (6 kg•cm) (0.6 N•m)	
	J-6252-520-A	Torque screwdriver (10 kg•cm) (1.0 N•m)	
⑦	3-184-527-01	Cleaning cloth (15 cm × 15 cm)	Cleaning
—	3-703-358-08	Parallel pin (2 mm × 20 mm)	Gear replacement (one pin required)
⑧	7-432-114-11	Locking compound 200 g	Inhibits loosening of screws
—	7-640-010-89	Oil (LX-206)	Lubrication
—	7-651-000-10	Sony grease SGL-601 (50 g)	Lubrication
⑨	7-700-736-06	L-shaped hexagonal wrench (d = 0.89 mm)	Skew adjustment
⑩	9-919-573-01	Cleaning liquid	Cleaning



1-14. Replacing NV-RAM and Memory Backup Battery

(1) Overview

This unit is provided with a batter backed RAM and EEPROMs on the boards.
These memory devices store system setup data, adjustment data, and other data.
When any of these devices or the backup battery is replaced, the memory data must be rewritten.

Board	Ref. No.	Type	Stored data
DPR-270	IC2009	RAM (with backup battery)	SYSTEM SEL setting data of setup menu CLIP INFORMATION setting data NUMERIC data of CLIP TITLE Error log data
DPR-270	IC1902	EEPROM	Hours meter data H1: OPERATION Serial number data TC PRESET value TIME ZONE data Free-running frequency adjustment value HD f0, SD f0, SDI f0 Setup menu data Menu bank 1-3 data Menu backup data for SAVE MENU DATA in MAINTENANCE MENU
DR-550G	IC603	EEPROM	Adjustment value of DRIVE MAINTENANCE menu Hours meter data H2: LASER PARAMETER H3: SEEK RUNNING H4: SPINDLE RUNNING H5: LOADING COUNTER
KY-580	IC402	EEPROM	LCD VCO adjustment value
ADC-50S	IC115	EEPROM	Free-running frequency adjustment value SDI DEC f0
NET-1	IC503	EEPROM	Control data

(2) Replacing Memory Backup Battery (IC2009/ DPR-270 board)

A crystal oscillator incorporating a backup battery is attached to IC2009 on the DPR-270 board.

WARNING

When replacing the part, be sure to use the specified one below.

Use of an unspecified part may result in burst, fire or heating.

Replacement part

Model: M4T28-BR12SH1
(lithium battery integrated crystal oscillator)
Part No.: ⚠ 1-767-156-11
Recommended replacement cycle:
10 years

Replacement

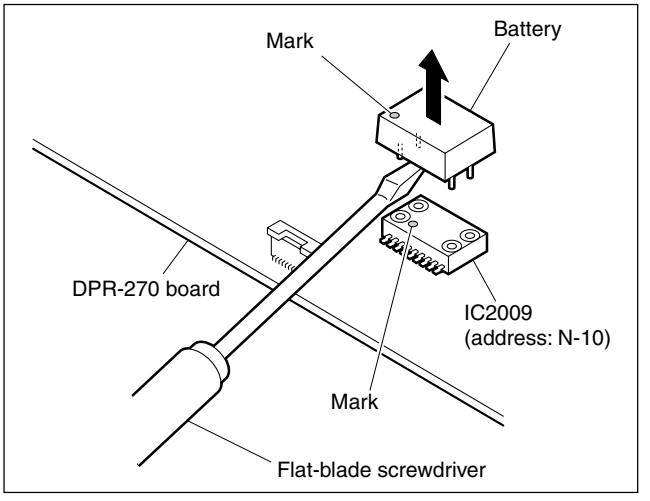
Note

When replacing the battery, install a new battery in correct orientation of the mark.

1. Take note of the following setting data, if possible.
   - SYSTEM SEL setting data of the setup menu
   - CLIP INFORMATION setting data
   - NUMERIC data of CLIP TITLE
   - Error log data

   Note

   Taking note of these data before replacement facilitates re-setting of menu data and other data after replacement of the battery. However, no error log data can be restored.
2. Turn off the power of the unit.
3. Remove the DPR-270 board. (Refer to Section 6-17-3.)
4. Insert a flat-blade screwdriver between the battery and IC2009 and detach the battery.



5. Install a new battery matching its mark with the mark on IC2009.
6. Install the DPR-270 board.
7. Turn on the power of the unit while pressing the MENU and RESET buttons simultaneously. When "ALL RESET" appears, release your fingers from the keys.
8. Press the SET button.

   Note

   Fixed values of the ROM is used for initialization data.
9. Restart the unit.
10. Perform the settings again using the data noted in step 1.

(3) Replacing NV-RAM (IC2009/DPR-270 board)

Replace IC2009, after detaching the battery. The other replacement steps are the same as those in (2) Replacing Memory Backup Battery (IC2009/DPR-270 board).

(4) Replacing EEPROM (IC1902/DPR-270 board)

Note

Even if this EEPROM is replaced in the field, no data can be initialized. When you need to replace this EEPROM, contact your local Sony Sales Office/Service Center.

(5) Replacing EEPROM (IC603/DR-550G board)

1. Turn off the power of the unit, and then remove the DR-550G board. (Refer to Section 6-17-4.)
2. Replace IC603 (D-1/side B).
3. Install the DR-550G board, and then turn on the power of the unit.
4. Perform UPLOAD TO EEPROM of the MAINTENANCE MENU. (Refer to Section 4-4-27.)

(6) Replacing EEPROM (IC402/KY-580 board)

1. Turn off the power of the unit, and then remove the KY-580 board. (Refer to Section 6-17-9.)
2. Replace IC402 (D-3/side A).
3. Install the KY-580 board, and then turn on the power of the unit.
4. Perform LCD VCO adjustment. (Refer to Section 8-6.)

(7) Replacing EEPROM (IC115/ADC-50S board)

1. Turn off the power of the unit, and then remove the ADC-50S board. (Refer to the Installation Instructions PDBK-104)
2. Replace IC115 (B-3/side A).
3. Install the ADC-50S board, and then turn on the power of the unit.
4. Perform SDI DEC free-running frequency adjustment. (Refer to Section 8-5.)

(8) Replacing EEPROM (IC503/NET-1 board)

Note

Even if this EEPROM is replaced in the field, no data canbe initialized. When you need to replace this EEPROM, contact your local Sony Sales Office/Service Center.

1-15. Firmware Update

This section describes how to update the firmware using the MAINTENANCE MENU.

Note

Update the firmware for the NET-1 borad on XDCAM website, no using the MAINTENANCE MENU. (Refer to Section 3.)

The following firmware programs and data are updated.

- CPU data (SYS) on the DPR-270 board
- ASIC (NOVA) setting data (NIOS, OSD) on the DPR-270 board
- FPGA configuration data (GOTA, ZATA) on the DPR-270 board
- DSP program data (DSP0-2, PRXV, PRXA, TMBP, TSYS) on the DPR-270 board
- FPGA configuration data (HDRX) on the RX-93 board
- CPU data (KY) on the KY-580 board
- Drive firmware program (DRV)
- Firmware program (TS, TSIC) on the TSI-54 board

A Memory Stick containing the new version firmware package file is required for the update.
For getting such firmware package file, contact your local Sony Sales Office/Service Center.
Put the firmware package file in the /MSSONY/PRO/XDCAM/PDWF70/ directory of the Memory Stick.

Notes

- To update the firmware programs (TS and TSIC) on the TSI-54 board, another package file is required.
- It takes about 14 minutes to update the firmware and another about four minutes to update the firmware on the TSI-54 board.
- If the Memory Stick is removed during update, it may become unavailable. Do not remove the Memory Stick during update.
- The LCD screen is refreshed during update, but this is not a problem.

Execution Procedure

1. Insert a Memory Stick containing the new version firmware package file into the Memory Stick slot on the rear panel.
2. Eject a remaining disc, if any.
3. Display the MAINTENANCE MENU.
   (Refer to Section 4-1.)
4. Choose “OTHERS” with the [↑]/[↓] buttons, and then press the [→] button.
5. Choose “SOFTWARE VERSION” with the [↑]/[↓] buttons, and then press the [→] button.
6. Press the [SET] button while pressing the [SHIFT] button.
   The PACKAGE UPDATE window opens.

```
     PACKAGE UPDATE


CURRENT          NEW
VERSION        VERSION
  1.00    -->    1.01


     VERSION UP OK?

     UPDATE :   SET KEY
      ABORT : RESET KEY
```

7. Update the firmware on the TSI-54 board using the following procedure.
   (1) Press the [↓] button several times to display the TS version in the time data display area.
   (2) Press the [SET] button while pressing the [SHIFT] button.
   The PACKAGE UPDATE window opens.

```
       TS UPDATE
       (PDBK-102)

CURRENT          NEW
VERSION        VERSION
  1.00    -->    1.01


     VERSION UP OK?

     UPDATE :   SET KEY
      ABORT : RESET KEY
```

   (3) Perform step 8 and the following steps.
8. Check the update information, and then press the [SET] button.
   The firmware update starts.
   Note
   Do not remove the Memory Stick during update.

9. A message “COMPLETE” appears when the update is completed.
10. Turn off and on the power of the unit.

1-16. Internal Video Test Signal

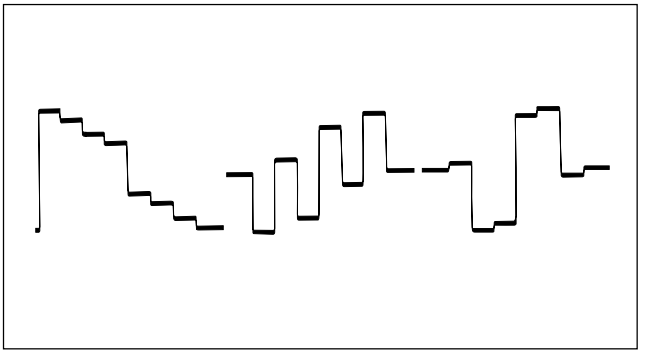
This unit has the internal video test signal generator.
The test signals output from the video test signal generator can be recorded.
Perform the following steps to output the test signals.

1. Press the [F1] button on the HOME menu to set the V INPUT to “SG”.
2. Press the [MENU] button on the HOME menu to display the system menu.
3. Select “SETUP MENU” using the [↑]/[↓] buttons, and press the [→] button.
4. Select “VIDEO CONTROL” using the [↓] button, and press the [→] button.
5. Select “INT VIDEO SG” using the [↑]/[↓] buttons, and press the [→] button.
6. Select the test signal to be output using the [↑]/[↓] buttons, and press the [SET] button.
   100% COLOR BARS: 100% color-bar signal
   RAMP (Y/C): RAMP signal
   GRAY: gray scale signal
   BLACK BURST: black burst signal

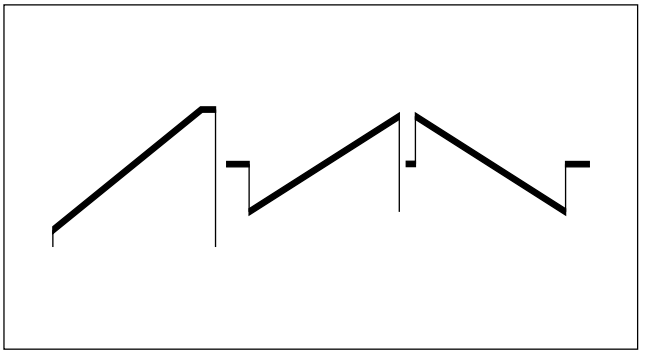
Describes output waveform figures of this generator in the next page.

HD video outputs

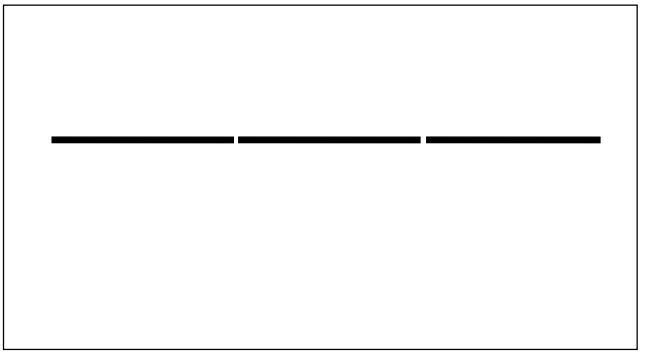
100% Color Bars



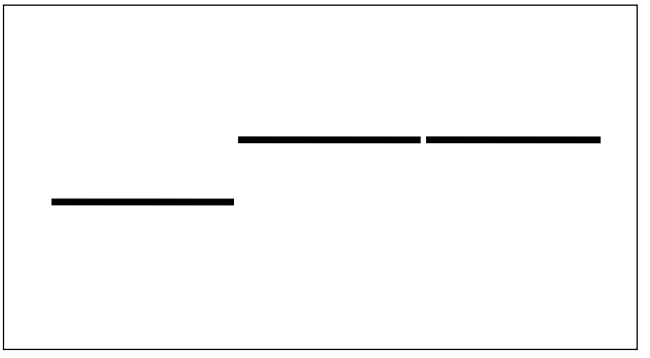
RAMP



Gray scale

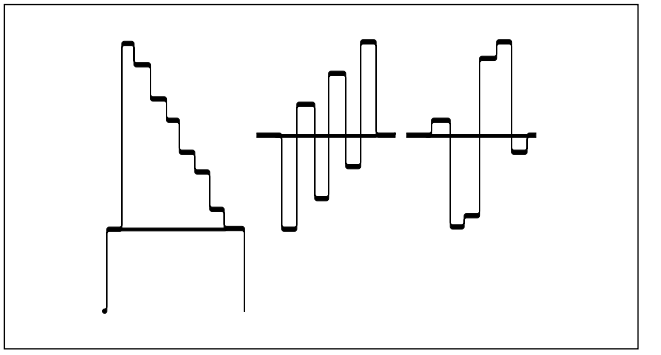


Black burst

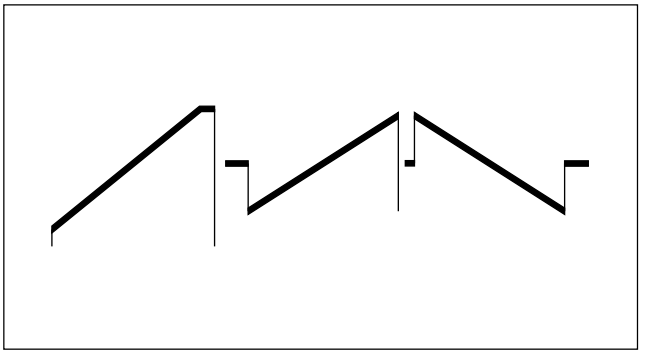


SD video outputs

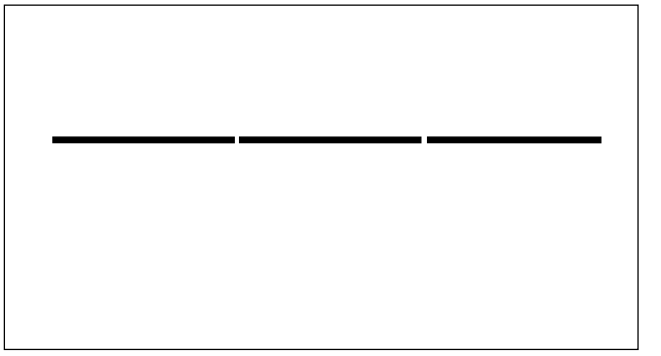
100% Color Bars



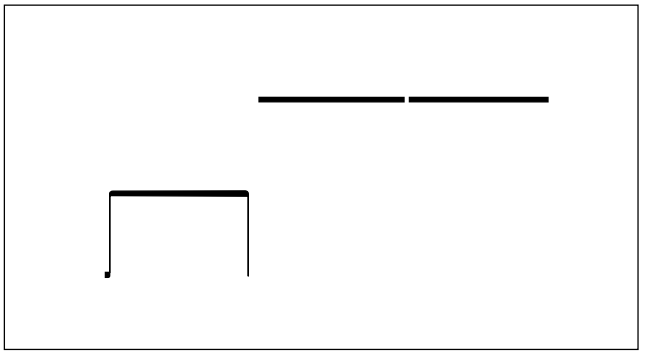
RAMP



Gray scale



Black burst



1-17. Service Action After Replacing or Repairing the Block and Board.

1-17-1. Optical Block Assembly

After replacing the optical block assembly, perform the following adjustments in descending order.
(Refer to Section 7-1-3.)
- Skew adjustment
- Optical Block Assembly Data Setting
- Laser Initial Data Setting
- Servo1 Automatic Adjustment
- RD adjustment
- Servo2 Automatic Adjustment
- Clear media log

1-17-2. DPR-270 Board

Perform the following re-settings after replacing or repairing the DPR-270 board or after replacing the NVRAM (IC2009).

Re-setting After Replacing the DPR-270 Board

Perform the re-settings after replacing the NVRAM and following re-settings after the DPR-270 board is replaced.

- Onboard switch S2103 setting (PDW-70MD only; Refer to Section 1-11.)
- Date and time "DATE/TIME PRESET" setting (Refer to the Operating Instructions.)
- Time code preset number "TC PRESET" setting (Refer to the Operating Instructions.)
- Setup menu setting (Refer to the Operating Instructions.)
- Menu bank 1 to 3 "SETUP BANK OPERATION" setting (Refer to the Operating Instructions)
- Serial number setting
  For more information, contact your local Sony Sales Office/Service Center.

Adjustments After Repairing the DPR-270 Board

After the DPR-270 board is repaired, perform the following adjustments after the re-settings above.
- Perform the free-running frequency adjustment. (Refer to Section 8.)
  8-2. HD Free-Running Frequency Adjustment
  8-3. SD Free-Running Frequency Adjustment (PDW-F70/70MD only)
  8-4. SDI ENC Free-Running Frequency Adjustment (PDW-F70/70MD only)

Re-setting After Replacing the NVRAM

- System setting "SYSTEM SEL" of the unit (Refer to the Operating Instructions.)
- Clip information "CLIP INFORMATION" setting (Refer to the Operating Instructions.)
- Clip title preset number "NUMERIC of CLIP AUTO TITLING" setting (Refer to the Operating Instructions.)
- Function menu setting (Refer to the Operating Instructions.)

1-17-3. DR-550G Board

This board includes EEPROM (IC603) that stores adjustment data, hours meter data, and other data.
Replace IC603 after the DR-550G board is replaced.

Execute the drive maintenance menu in the following order after replacing or repairing the DR-550G board.
1. SET OPTICAL DATA (Refer to Section 4-4-17.)
2. INITIALIZE SE (Refer to Section 4-4-18.)
3. ACCELERATION OFFSET (Refer to Section 4-4-22.)
4. SERVO_1 (Refer to Section 4-4-19.)
5. SERVO_2 (Refer to Section 4-4-21.)
6. CLEAR MEDIA LOG (Refer to Section 4-4-26.)

1-17-4. KY-580 Board

Perform the LCD VCO adjustment after repairing the KY-580 board. (Refer to Section 8-6.)

1-17-5. SE-800 Board

Carry out "ACCELERATION OFFSET" of the maintenance menu after replacing the SE-800 board.
(Refer to Section 4-4-22.)

1-17-6. ADC-50S Board

Perform the SDI DEC free-running frequency adjustment after repairing the ADC-50S board. (Refer to Section 8-5.)

1-18. Connecting/Disconnecting the Flexible Card Wire

This unit uses the four types of flexible card wires.

Notes

- Be very careful not to fold the flexible card wire. Life of flexible card wire will be significantly shortened if it is folded.
- The flexible card wire has the conduction side and the insulation side. If the conduction side and the insulation side are connected in the wrong direction, the circuit will not function.
- Insert the flexible card wire straight.
- Ensure that the conduction surface of the flexible card wire is not contaminated.

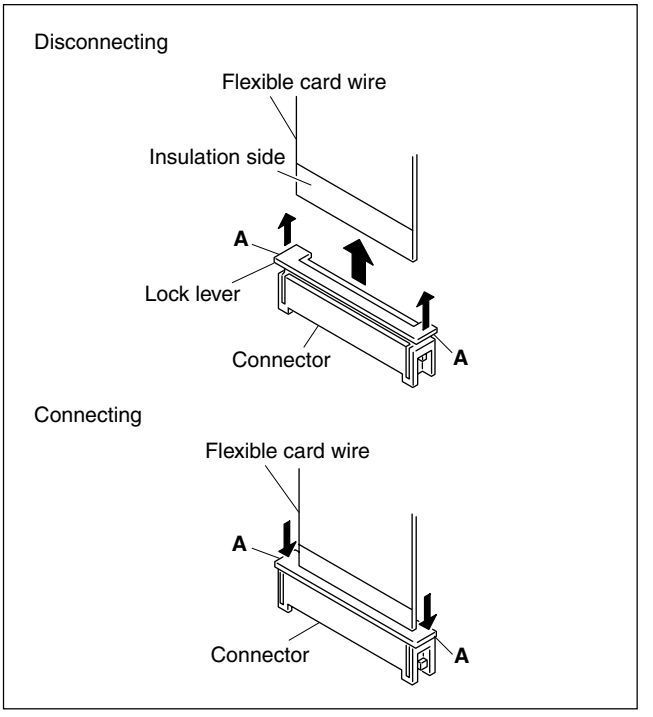
Type A

Disconnecting

Slide portions A of the connector to unlock, and disconnect the flexible card wire.

Connecting

Insert the flexible card wire firmly as far as it will go, and push down portions A of the connector.



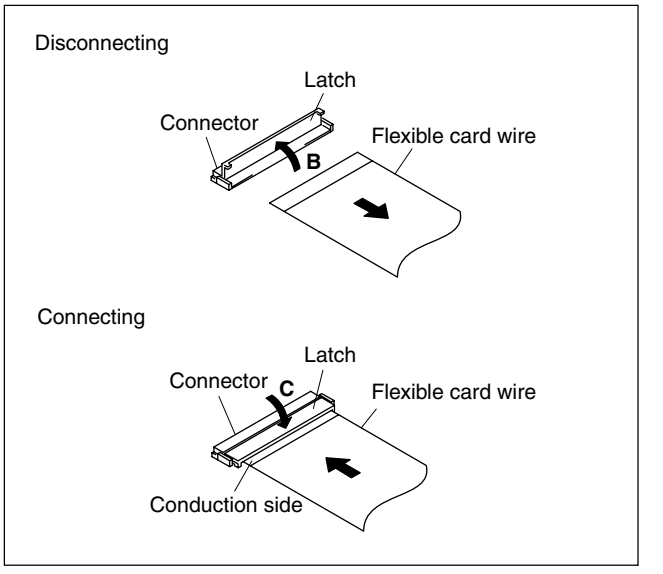
Type B

Disconnecting

Open the latch of the connector in the direction of arrow B to unlock, and disconnect the flexible card wire.

Connecting

1. Insert the flexible card wire firmly as far as it will go, with the conduction side up.
2. Close the latch of the connector in the direction of arrow C to lock.



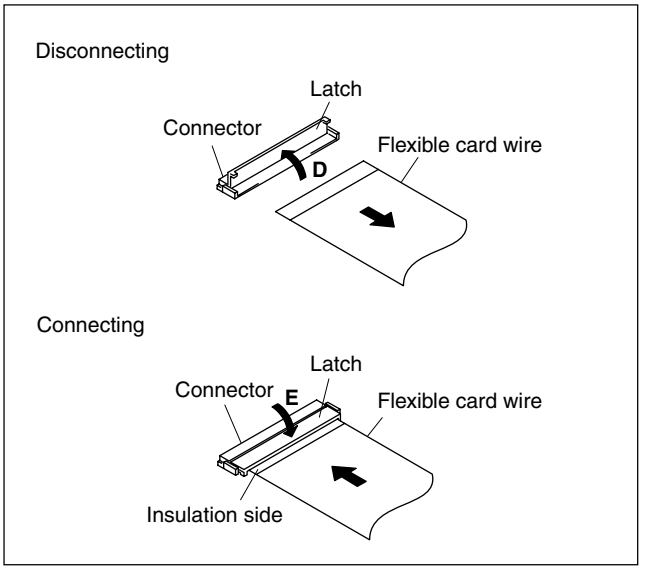
Type C

Disconnecting

Open the latch of the connector in the direction of arrow D to unlock, and disconnect the flexible card wire.

Connecting

1. Insert the flexible card wire firmly as far as it will go, with the insulation side up.
2. Close the latch of the connector in the direction of arrow E to lock.



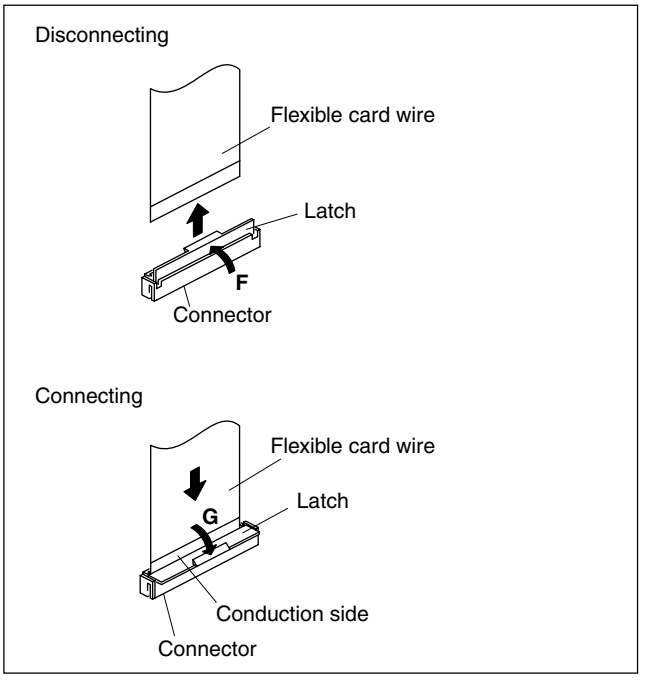
Type D

Disconnecting

Open the latch of the connector in the direction of arrow F to unlock, and disconnect the flexible card wire.

Connecting

1. Insert the flexible card wire firmly as far as it will go, with its conduction side facing front.
2. Close the latch of the connector in the direction of arrow G to lock.



1-19. i.LINK Controlling Command

AV/C Command List

The following list shows AV/C command (Only VCR Subunit Command) of which are supported with this unit.
AV/C command conform to 1394 TA Document AV/C Digital Interface Command Set General Specification/VCR Subunit Specification Version 2.0.1 Jan.5,1998.

AV/C command has the following three types.

- CONTROL Command : Control command
- STATUS Inquiry Command : Sense command
- SPECIFIC Inquiry Command : Inquiry command whether control command are supported or not.

∗ C and S of the Support shows the CONTROL Command and STATUS Command.

Opecode	Value	Support		Comments
		C	S	
ABSOLUTE TRACK NUMBER	52h	○	○	Absolute Track Number search/sense command
BINARY GROUP	5Ah		○	Binary Group Data sense command
LOAD MEDIUM	C1h	○		Eject command
MEDIUM INFO	DAh		○	Tape Information sense command
OUTPUT SIGNAL MODE	78h	○	○	Output Signal Mode control command
PLAY	C3h	○		Play/Search command
RECORD	C2h	○		Record command
RELATIVE TIME COUNTER	57h	○	○	COUNTER search/sense/preset command
SEARCH MODE	50h		○	Search Mode sense command
SMPTE/EBU TIME CODE	59h	○	○	Time Code search/sense command
TIME CODE	51h	○	○	Time Code search/sense command
TRANSPORT STATE	D0h		○	Tape transport sense command
WIND	C4h	○		STOP/FF/REW command

1-20. Notes on Handling Optical Block Assembly

To prevent the damage due to the electrostatic charge, be sure to put the following grounding while handling the optical block assembly (KES-110A).

Grounding for the human body

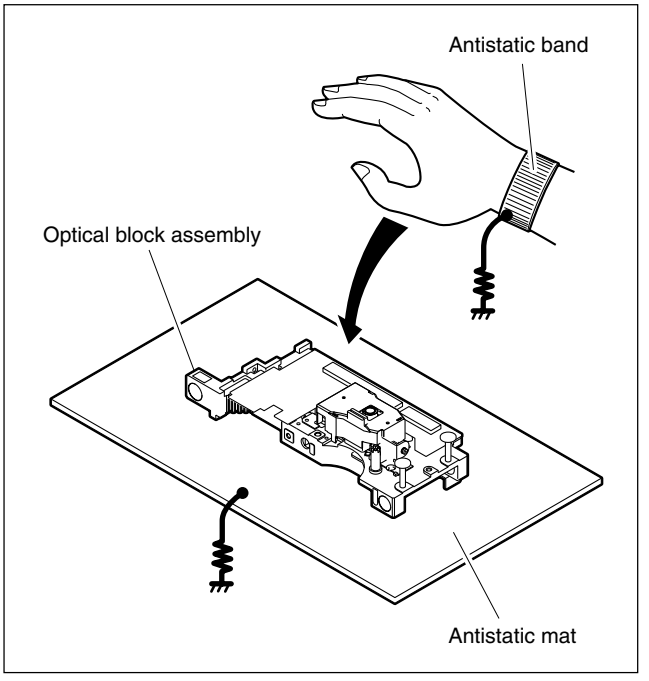
Be sure to put on an antistatic band for grounding (with impedance lower than 10^8 Ω) whose other end is grounded.

Note

Because static electricity charged on clothes is not drained away, be careful not to touch your clothes to the optical block assembly.

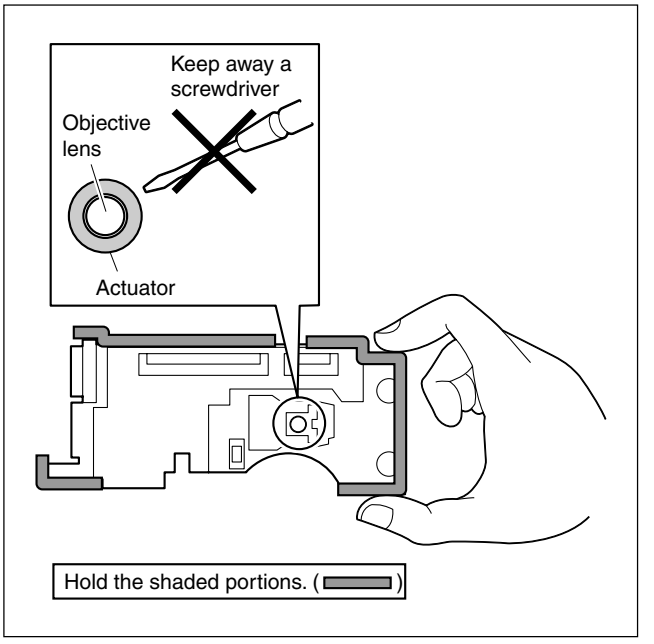
Grounding for the work table

Be sure to place the optical block assembly on an antistatic mat (with impedance lower than 10^9 Ω recommended) or a copper sheet for grounding.



Precautions

- The optical block assembly is a precise unit. Be careful not to subject it to shocks by dropping or rough handling.
- Do not touch the objective lens.
- Hold the slide base (die casting part) when handling the optical block assembly.
  Do not touch the circuit on the print board with your hand or a substance directly; otherwise, the circuit may be damaged.
- The performance of the actuator may be affected if a magnetic material is located nearby, since the actuator has a strong magnetic field.
  Keep magnetic substance away from the actuator. if the magnetic force makes a metallic material such as a screwdriver, reflection block and so on hit the actuator, the objective lens will be damaged.
- Do not allow foreign materials to enter through gap in the cover of the actuator.



1-21. Unleaded Solder

Unleaded solder is used for all the boards of this unit. Boards requiring use of unleaded solder are printed with a lead free mark (LF) indicating the solder contains no lead. (Caution: Some printed circuit boards may not come printed with the lead free mark due to their particular size.)

: LEAD FREE MARK

Notes

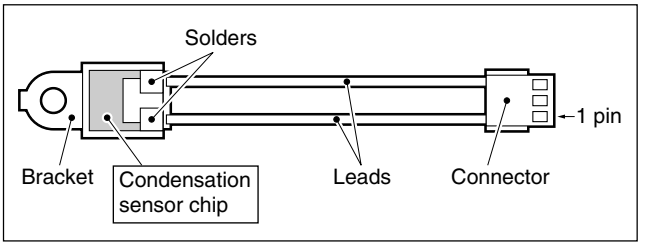
- Be sure to use the unleaded solder for the boards of this unit.
- The unleaded solder melts at a temperature about 40 °C higher than the ordinary solder, therefore, it is recommended to use the soldering iron having a temperature regulator.
- The ordinary soldering iron can be used but the iron tip has to be applied to the solder joint for a slightly longer time. The printed pattern (copper foil) may peel away if the heated tip is applied for too long, so be careful.

1-22. Precautions for use of Condensation Sensor

Due to the foreign substances adhering to the condensation sensor chip (see figure below), the sensor fails to measure the correct value of residence to humidity. This prevents the unit from functioning properly. If any foreign substance gets adhered to the chip, replace the condensation sensor with a new one.

Notes

- Do not touch the chip with bare hands.
- Do not clean the chip with alcohol or other similar agents.



1-23. Memory Stick

The Memory Stick can be used to update software from the maintenance menu of the unit.
Insert a Memory Stick into the Memory Stick slot on the connector panel.
The 8, 16, 32, 64, and 128 MB types are avilable.

Memory Stick Media Table

Memory Stick	Yes
Memory Stick Duo	Yes
Memory Stick (MagicGate/Correspond to High-speed data transfer)	Yes (*1)
Memory Stick Duo (MagicGate/Correspond to High-speed data transfer)	Yes (*1)
MagicGate Memory Stick	Yes
MagicGate Memory Stick Duo	Yes

*1: This media does not correspond to MagicGate or high-speed data transfer.

Notes

- If the “Memory Stick Duo” or “MagicGate Memory Stick Duo” is used with a standard-size Memory Stick compatible device, always insert it in the attached (or separately available) Memory Stick Media Adaptor. If you insert directly, the Memory Stick media may not be removed.
- It does not guarantee entire operation of Memory Stick media. Some products are not available.

Memory Stick, Memory Stick PRO, Memory Stick Duo, and Memory Stick PRO Duo are the registered trademarks or trademarks of the Sony Corporation.

Memory Stick format

Always format Memory Sticks to be used in this unit using MS FORMAT in the maintenance menu. (Refer to Section 4-8-3.) Be sure to use Memory Stick Formatter on a PC provided with a Memory Stick slot or a Memory Stick adapter.
Further create the following directory in a formatted Memory Stick.
/MSSONY/PRO/XDCAM/PDWF70/

Note

Once formatting is executed, Memory Stick data is entirely cleared.

Section 2
Error Messages

2-1. Error Messages Overview

This unit has a self diagnosis function to check internal errors.
When the unit detects an error, its error code and description are displayed on the following display units.

- Time data display (error code only)
- Monitor image display
- Video monitor connected to connector MONITOR

When an error occurs, its error code information is recorded in the error logger (maintenance logger) of the main unit and also in the error logger (drive logger) of the drive unit.
Refer to respective error tables for display contents on the time data display and for recording/non-recording in the error loggers.

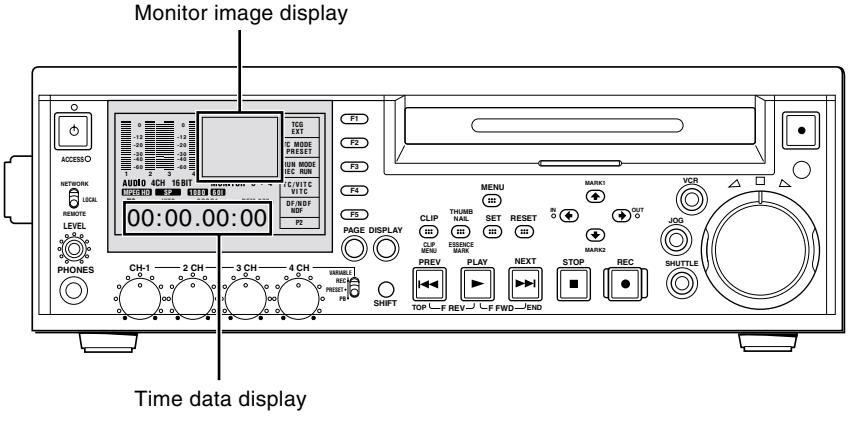
Note

"Time data display" column:

"←" means that the same error code as the left one is displayed.

"Maintenance logger", "Drive logger" columns:

- "○" means that the error is recorded in the logger.
- "×" means that the error is not recorded in the logger.



PDW-F70 (Front view)

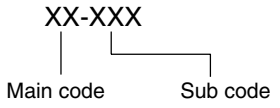
Sample of display (on a video monitor)

ERROR

AN ERROR HAS BEEN DETECTED. INFORM SERVICE OF FOLLOWING CODE: XX-XXX

2-2. Error Code List

An error code is provided in combination of 2-digit main code and 3-digit sub code.



Main code	Main error description
0X	Optical drive control errors, device errors
	• 02: Optical devices (LD, LCD)
	• 03: Optical drive two-axis (FCS, TRK)
	• 04: Optical drive seeking
	• 06: Optical drive expander
	• 08: Optical drive spindle
20	Loader (P1) assembly errors
3X	Optical drive sensor system errors
5X	Read data errors
6X	Startup errors
91	Interface errors between CPU and peripheral devices
92	Synchronization system errors
95	Video/audio signal processing device errors

For details of sub codes, refer to respective error tables.

If multiple errors occur simultaneously

The highest-priority error is displayed.
When a higher-priority error is cleared, the following-priority error code is displayed.

Protection Mode

When this unit detects an error, it enters a protection mode to prevent the cartridge disc, optical drive, and other components from damage or failure.
The protection mode depends on error status. When a cartridge is inserted, press the EJECT button and remove the cartridge.

2-2-1. Error 0X

When errors related to optical drive control or to devices are detected, the following error codes are displayed.

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
02	020	←	○	○	Optical block assembly (refer to as OP hereafter) is recording at maximum laser output. Perform the pickup lens cleaning. (Refer to Section 4-4-16.)
	X25	←	○	○	OP laser output error is detected.
	X26	←	○	○	OP laser output coefficient cannot be adjusted.
	X27	←	○	○	OP laser current is abnormal (zero or excessive).
	X28	←	○	○	OP laser output is stopped judging that no cartridge is inserted.
	X31	←	○	○	OP LCD shutter does not open.
03	X54	←	○	○	No signal from disc required for OP focus servo can be detected.
	X57	←	○	○	No control current is detected in OP focus servo.
	X58	←	○	○	Excessive control current is detected in OP focus servo.
	X67	←	○	○	No control current is detected in OP tracking servo.
	X68	←	○	○	Excessive control current is detected in OP tracking servo.
	060	←	×	○	OP is operating with tracking servo characteristics down.
04	X7C	←	○	○	OP cannot move to disc's innermost circumference.
	X7D	←	○	○	OP cannot move to disc's outermost circumference.
06	E41	←	○	○	OP expander home position cannot be detected during startup adjustment.
	F41	←	○	○	OP expander home position cannot be detected during power-on initialization.
08	091	←	○	○	Spindle motor does not rotate after the predetermined time has passed (or no FG signal is detected).
	095	←	○	○	Spindle motor cannot be stopped (or abnormal FG signal is detected).
	292	←	○	○	Spindle motor rotation is detected during vertical move of loading. *
	992	←	○	○	Spindle motor rotation is detected during vertical move of unloading. *

* : The vertical move of loading/unloading is also carried out by STBY ON/OFF.

Note

Any number of the following is applicable for “X” in the sub codes above, showing an operation status where the error is detected.

Example) 827: Laser current of optical block assembly is abnormal (zero or excessive) “during horizontal move of unloading”.

0: Operation cannot be identified or no need to be identified.
1: During loading
2: During vertical move of loading
3: Disc is not rotating
4: Seeking
5: Reading
6: Writing
7: Standby state
8: During horizontal move of unloading
9: During vertical move of unloading
A: During disc removal
B: During lens cleaning or device checking
C, D: (Not used)
E: During startup adjustment of optical block assembly
F: During power-on initialization of optical block assembly expander

2-2-2. Error 20

When errors related to loader (P1) assembly are detected, the following error codes are displayed.

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
20	111	←	○	○	Horizontal move of loading did not end within the predetermined time.
	117	←	○	○	Displacement of cartridge is detected in the loader during horizontal move of loading.
	211	←	○	○	Vertical move of loading did not end within the predetermined time.
	213	←	○	○	Cartridge cannot be detected after loading.
	217	←	○	○	Displacement of cartridge is detected in the loader during vertical move of loading.
	811	←	○	○	Horizontal move of unloading did not end within the predetermined time.

2-2-3. Error 3X

When errors related to the optical drive sensor system are detected, the following error codes are displayed.

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
34	500	←	○	○	Loader position sensor (SE-709 board) is detects abnormal code.
35	500	ACC Sensor!	×	○	Abnormality of acceleration sensor is detected.
37	500	High TEMP!	×	○	Optical block assembly temperature sensor detects abnormal status.
39	500	Skew Sensor	×	○	Abnormality of skew sensor in optical block assembly is detected.
3A	500	Skew Sensor	×	○	Abnormality of skew sensor in optical block assembly is detected.
3C	500	HUMID!	×	○	Dew condensation is detected.

2-2-4. Error 5X

When read data errors are detected, the following error codes are displayed.

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
50	010	(Not displayed)	×	○	BCA area data cannot be read.
	011	(Not displayed)	×	○	BCA area data is invalid.
51	020	DI read err	×	○	PIC area data cannot be read.
	021	DI read err	×	○	PIC area data is invalid.
52	X0B	Read err	×	○	Address cannot be read from disc in optical block assembly.

Note

Any number of the following is applicable for “X” in the sub codes above, showing an operation status where the error is detected.

Example) 80B: Address cannot be read from the disc in optical block assembly “during horizontal move of unloading”.

0: Operation cannot be identified or no need to be identified.
1: During loading
2: During vertical move of loading
3: Disc is not rotating
4: Seeking
5: Reading
6: Writing
7: Standby state
8: During horizontal move of unloading
9: During vertical move of unloading
A: During disc removal
B: During lens cleaning or device checking
C, D: (Not used)
E: During startup adjustment of optical block assembly
F: During power-on initialization of optical block assembly expander

2-2-5. Error 6X

When errors related to startup operation are detected, the following error codes are displayed.

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
60	E00	(Not displayed)	×	○	Optical block assembly cannot seek to target position during startup.
6F	E00	DRV ADJ err	×	○	Optical block assembly startup adjustment cannot be completed.

2-2-6. Error 91

When interface errors between CPU and peripheral devices are detected, the following error codes are displayed.

Note

System control CPU: IC1900 on the DPR-270 board

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
91	125	←	○	×	System control CPU detects interruption in communication with key control CPU (KY: IC501/KY-580 board).
	130	←	○	×	System control CPU detects flash memory (IC1909, IC1910/DPR-270 board) error.
	139	←	○	×	System control CPU detects an error in setup menu data area (EEPROM: IC1902/DPR-270 board).
	13A	←	○	×	System control CPU detects NVRAM (IC2009/DPR-270 board) error.
	13B	←	○	×	System control CPU detects an error in hours meter area (EEPROM: IC1902/DPR-270 board).
	13C	←	○	×	System control CPU detects an error in adjustment data area (EEPROM: IC1902/DPR-270 board).
	13D	←	○	×	System control CPU detects an error in hours meter area (EEPROM: IC1902/DPR-270 board).
	155	←	○	×	Communication between system control CPU and optical drive (DR-550G board) is interrupted.
	215	←	×	×	Key control CPU (KY: IC501/KY-580 board) detects interruption in communication with system control CPU.
	430	←	○	×	CPU (NET-1 board) detects flash memory (IC401/NET-1 board) error. *
	551	←	○	○	Optical drive's system control CPU (DRV: IC600/DR-550G board) detects firmware error. Perform the firmware update. (Refer to Section 1-17.)
	595	←	○	○	Optical drive's system control CPU (IC600/DR-550G board) detects interruption in communication with SV DSP (IC400/DR-550G board).

* : This error message is displayed only when the PDBK-101 is installed.

2-2-7. Error 92

When synchronization system errors are detected, the following error codes are displayed.

Note

System control CPU: IC1900 on the DPR-270 board

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
92	101	←	○	×	System control CPU detects REF error.

2-2-8. Error 95

When interface errors between device ICs are detected, the following error codes are displayed.

Note

System control CPU: IC1900 on the DPR-270 board

Optical drive's system control CPU (DRV): IC600 on the DR-550G board

Main code	Sub code	Time data display	Maintenance logger	Drive logger	Description
95	101	←	○	×	Communication error between system control CPU and PCI bridge (IC100/NET-1 board) is detected. *1
	102	←	○	×	Communication error between system control CPU and i.LINK (IC2300/ DPR-270 board) is detected.
	103	←	○	×	Communication error between system control CPU and video decoder (IC112/ADC-50 board) is detected. *2
	104	←	○	×	Communication error between system control CPU and MPEG HD encoder (TORINO: IC100/ENC-101 board) is detected. *3
	109	←	○	×	Communication error between system control CPU and DSP0 (IC1500/ DPR-270 board) is detected. *3
	10A	←	○	×	Communication error between system control CPU and DSP1 (IC1502/ DPR-270 board) is detected.
	10B	←	○	×	Communication error between system control CPU and DSP2 (IC1501/ DPR-270 board) is detected.
	10C	←	○	×	Communication error between system control CPU and PROXY AUDIO DSP (IC1600/DPR-270 board) is detected.
	10D	←	○	×	GEOS (IC1100/DPR-270 board) configuration error is detected.
	10E	←	○	×	NOVA (IC400/DPR-270 board) configuration error is detected.
	110	←	○	×	Combination error between DPR-270 board and RX-93 board. *3
	503	←	○	○	Optical drive's BDC (IC300/DR-550G board) error is detected during initial check.
	505	←	○	○	Optical drive's FEP (IC200/DR-550G board) setting value error is detected.
	506	(Not displayed)	×	○	In optical block assembly, laser driver IC setting value error is detected.
	507	(Not displayed)	×	○	Optical drive's FEP (IC200/DR-550G board) setting value error is detected.
	509	←	○	○	Adjustment data cannot be read from optical drive's EEPROM (IC603/DR-550G board).
	50A	←	○	○	Hours meter data cannot be read from optical drive's EEPROM (IC603/ DR-550G board).
	50C	←	○	○	Optical drive's SY-PLD (IC700/DR-550G board) configuration error is detected.
	50F	←	○	○	Cannot access SDRAM (IC301/DR-550G board) for Optical driver's BDC (IC300/DR-550G board).
	513	←	○	○	Optical drive's BDC (IC300/DR-550G board) cannot set the SDRAM mode.
	51C	←	○	○	Optical drive's BDC (IC300/DR-550G board) cannot reset free-run by SYSPE (IC700/DR-550G board).
	51F	←	○	○	An error of SDRAM address circuit of optical drive's BDC (IC300/DR-550G board) is detected.
	526	←	○	○	In optical block assembly, laser driver IC setting value cannot be recovered from abnormal state.
	527	←	○	○	Optical drive's FEP (IC200/DR-550G board) setting value cannot be recovered from abnormal state.
	52C	←	○	○	Auto setting by SYSPE (IC700/DR-550G board) is disabled with power control of optical drive's BDC (IC300/DR-550G board).

∗1: This error message is displayed only when the PDBK-101 is installed.

∗2: This error message is displayed only when the PDBK-103/104 is installed.

∗3: This error message is displayed only when the PDW-F70/70MD.

Section 3
XDCAM Web Site

3-1. XDCAM Web Site Overview

Operations such as confirming the settings of the unit and upgrading the firmware on the NET-1 board can be performed via the network terminal.

Note

The firmware update through the NETWORK connector can be implemented only on the NET-1 board. For the update of other firmware, refer to "1-15. Firmware Update".

The XDCAM website consists of the following menus.

Status menu

- Device Information
- Hours Meter
- Software Version

Maintenance menu

- Download
- Account
- Network

Connecting to XDCAM Website

Tools/Equipment Required

- Personal computer (referred to as PC hereafter)
- Network cable (crossover or straight-through)

Procedure

1. Connect the unit to the host PC using one of the following ways. (Refer to "Operation Manual".)
   - Connect the unit to the host PC through a network device (such as a hub).
   - Directly connect the unit to the host PC.

2. Start the web browser of the host PC. Enter "http://192.168.1.10" in the Address bar. (The underlined part is the IP address of the unit.)

   Note

   Be sure to use Internet Explorer for the web browser of the host PC.
   Other web browsers will not function correctly.

3. Enter "admin" for User name and "pdw-f70" for Password, and then click "OK".

   Notes

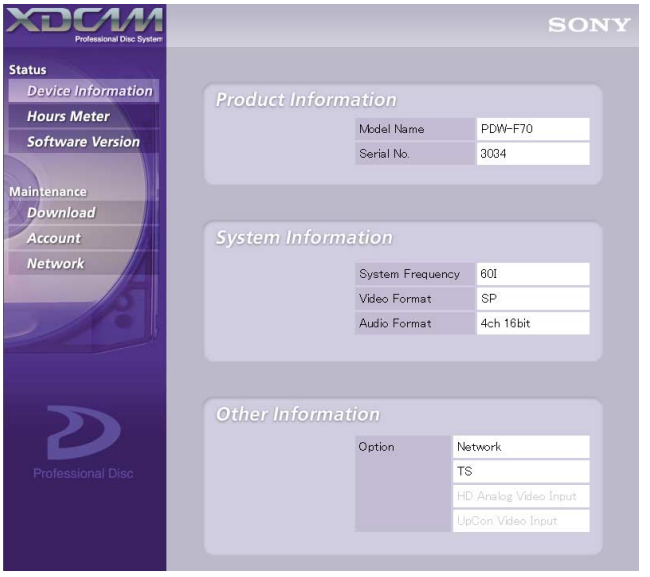
   - In case of the PDW-70MD, enter "pdw-70md" for password. In case of the PDW-F30, enter "pdw-f30".
   - User password can be changed on the Account page.

4. The XDCAM top page appears. Click a menu you want to browse on the left frame.

3-2. Status Menu

3-2-1. Device Information

The settings of the unit can be checked in the Device Information page of the Status menu.



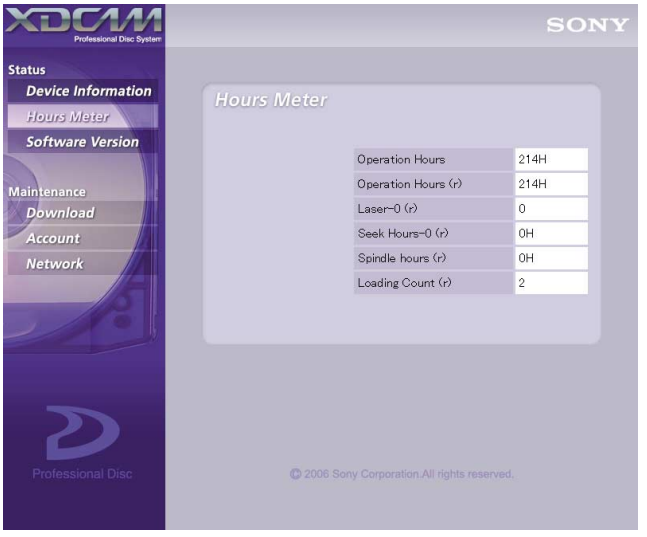
Item		Setting	Function
Product Information	Model Name	Display only	Displays the model name.
	Serial No.	Display only	Displays the serial No.
System Information	System Frequency	Display only	Displays the signal standard.
	Video Format	Display only	Displays the video recording format.
	Audio Format	Display only	Displays the audio recording format.
Other Information	Option	Display only	Displays the installed option.

3-2-2. Hours Meter

The hours meter of the unit can be displayed on the Hours Meter page of the Status menu.

Note

The function is the same as that of the digital hours meter of the basic setup menu on the unit.
For “How to reset the hours meter”, contact your local Sony Sales Office/Service Center.



Item	Setting	Function
Operation Hours	Display only	Displays the total operation hours
Operation Hours (r)	Display only	Displays the total operation hours (Unit: hour, Resettable)
Laser-0 (r)	Display only	Displays the output count of laser on optical block assembly * (Resettable)
Seek Hours-0 (r)	Display only	Displays the total running hours of seek on optical block assembly (Unit: hour, Resettable)
Spindle Hours (r)	Display only	Displays the total running hours of spindle motor (Unit: hour, Resettable)
Loading Count (r)	Display only	Displays the total loading counts of disc (Resettable)

* : Increment of the counter depends on recording/playback ratio and operating temperature.

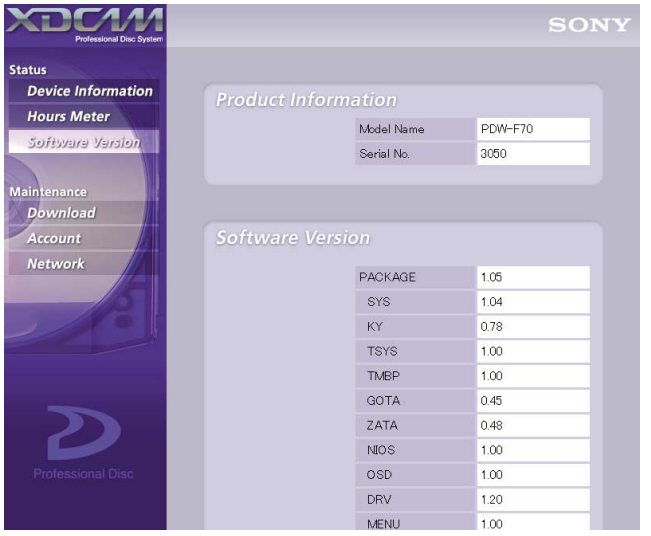
3-2-3. Software Version

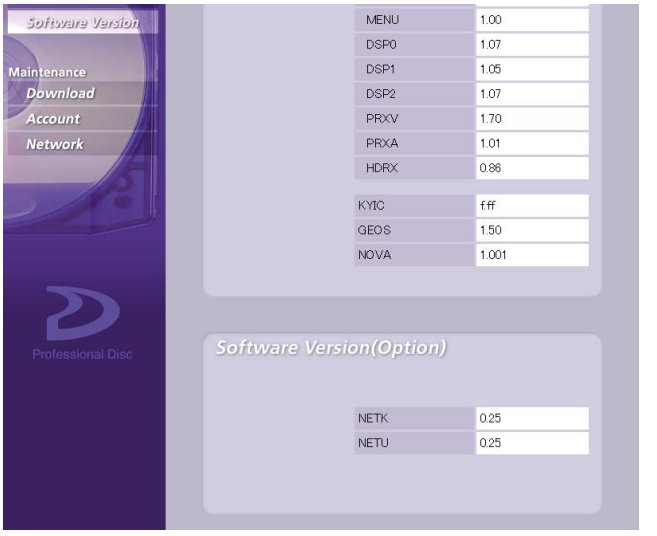
The version of the software can be checked in the Software Version page of the Status menu.

Note

The function is the same as that of the SOFTWARE VERSION menu of the OTHERS of the MAINTENANCE menu on the unit.

(full version display)





Item	Setting	Function	
Product Information	Model Name	Display only	Displays the model name.
	Serial No.	Display only	Displays the serial No.
Software Version	PACKAGE	Display only	Shows the firmware package version.
	SYS	Display only	Shows the version of ROM (IC1909, IC1910) on IC1900/DPR-270 board. *1
	KY	Display only	Shows the version of ROM (IC602) on IC501/KY-580 board. *1
	TSYS	Display only	Shows the version of ROM (IC1909, 1910/DPR-270 board) on IC100/ ENC-101 board. *1
	TMBP	Display only	Shows the version of ROM (IC1909, 1910/DPR-270 board) on IC100/ ENC-101board. *1
	GOTA	Display only	Shows the version of ROM (IC1909, IC1910) on IC2500/DPR-270 board. *1
	ZATA	Display only	Shows the version of ROM (IC1909, IC1910) on IC2900/DPR-270 board. *1
	NIOS	Display only	Shows the version of ROM (IC1909, IC1910) on IC400/DPR-270 board. *1
	OSD	Display only	Shows the version of ROM (IC1909, IC1910) on IC400/DPR-270board. *1
	DRV	Display only	Shows the version of ROM (IC602) on IC600/DR-550G board. *1
	MENU	Display only	Shows the version of ROM (IC1909, IC1910) on IC1900/DPR-270 board. *1
	DSP0	Display only	Shows the version of ROM (IC1909, IC1910) on IC1500/DPR-270 board. *1
	DSP1	Display only	Shows the version of ROM (IC1909, IC1910) on IC1502/DPR-270 board. *1
	DSP2	Display only	Shows the version of ROM (IC1909, IC1910) on IC1501/DPR-270 board. *1
	PRXV	Display only	Shows the version of ROM (IC1909, IC1910) on IC1700/DPR-270 board. *1
	PRXA	Display only	Shows the version of ROM (IC1909, IC1910) on IC1600/DPR-270 board. *1
	HDRX	Display only	Shows the version of ROM (IC103) on IC300/RX-93 board. *1
	KYIC	Display only	Shows the version of ROM (IC201) on IC200/KY-580 board.
	GEOS	Display only	Shows the version of IC1100/DPR-270 board.
	NOVA	Display only	Shows the version of IC400/DPR-270 board.
Software Version (Option)	NETK	Display only	Shows the version of ROM (IC401) on IC200/NET-1 board.
	NETU	Display only	Shows the version of ROM (IC401) on IC200/NET-1 board.
	TS	Display only	Shows the version of ROM (IC201) on IC700/TSI-54 board.
	TSIC	Display only	Shows the version of ROM (IC201, IC303, IC706) package on IC200, 300, 700/TSI-54 board.
	ADV	Display only	Shows the version of ROM (IC301) on IC300/ADC-50, ADC-50S board.

*1: Using the firmware package file, the version can be upgraded.

3-3. Maintenance Menu

3-3-1. Download

In the Download page of the Maintenance menu, the batched update using the firmware package file can be performed.
The affected firmware programs are for NETK and NETU on the NET-1 board.
For the update procedure for other firmware programs, refer to “1-15. Firmware Update”.

In this section, the update method using the Web browser (Internet Explorer) is explained.

Note

The figures shown in this page are the sample of display. Due to the specification change, the actual screen display may differ from the sample figures.

Tools/Equipment Required

- Personal Computer (hereafter called PC)
- Firmware Package File
- Network Cable (Crossover or straight through cable)

For obtaining the firmware package, contact your local Sony Sales Office/Service Center.

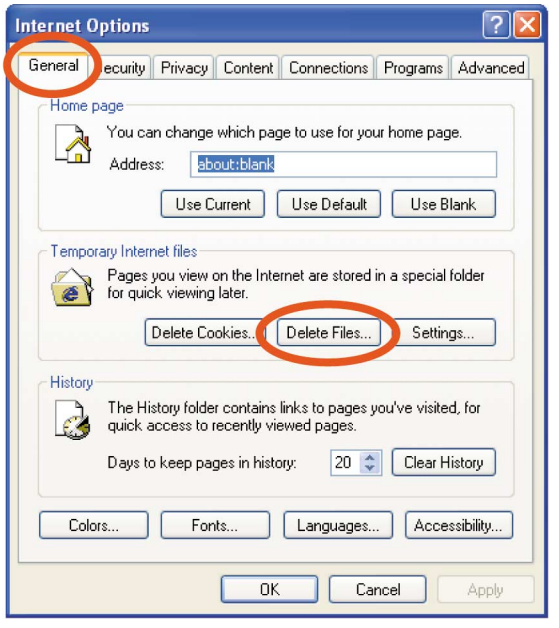
Preparation

1. Eject the disc.
2. Remove the i.LINK cable, the headphones and the audio cable.
3. Connect the unit in either method mentioned below. (Refer to the Instruction Manual.)
   - Connect the unit and the host PC via other network device (such as a hub).
   - Connect the unit and the PC directly (using network crossover cable).
4. Copy the obtained firmware package to an arbitrary directory on the host PC.
5. Start up the Internet Explorer of host PC.

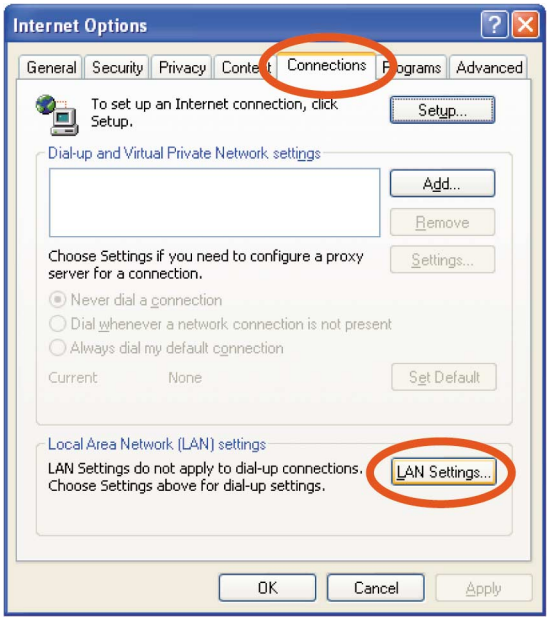
   Note

   Be sure to use the Internet Explorer for updating.
   If other browser is used, the update cannot be properly done.

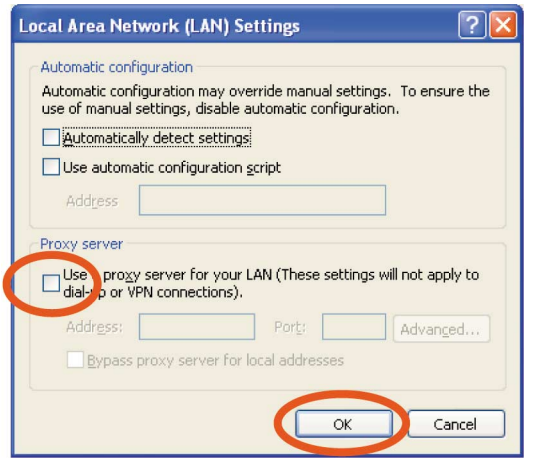
6. Select “Tool” - “Internet Options”.
7. Click “Delete Files” on the “General” page to delete the Temporary Internet files.



8. The confirmation message appears. Click “OK”.
9. Click “LAN Settings” on the “Connections” page.



10. Confirm that the checkbox of “Use a proxy server for your LAN” is not checked. If checked, uncheck the checkbox.
11. Click “OK”.


Local Area Network (LAN) Settings
Automatic configuration
Automatic configuration may override manual settings. To ensure the use of manual settings, disable automatic configuration.
Automatically detect settings
Use automatic configuration script
Address
Proxy server
Use a proxy server for your LAN (These settings will not apply to dial-up or VPN connections).
Address:
Port:
Advanced...
Bypass proxy server for local addresses
OK
Cancel

12. Click “OK” on the Internet Options window.

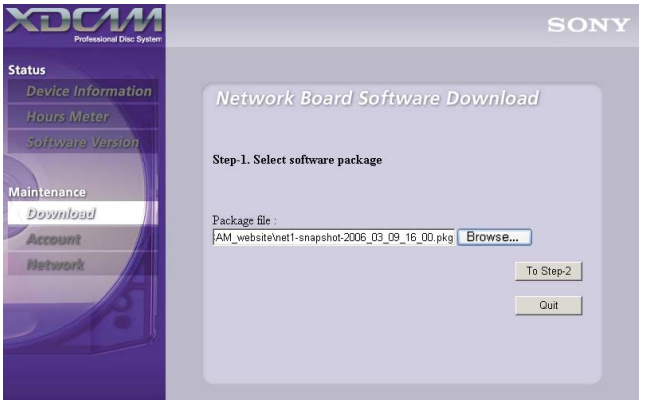
Update Procedure

1. Start up the Internet Explorer, and enter “http://192.168.1.10” in the Address bar. (Where the underlined part is the IP address of the uni.)
2. Enter “admin” for User name and “pdw-f70” for Password. Then click “OK”.
   The XDCAM top page appears.

   Note

   In case of the PDW-70MD for Password, enter “pdw-70md”. In case of the PDW-F30, enter “pdw-f30”.

3. Click “Download” on the Maintenance menu in the left frame.
4. Click “Browse” and select the firmware package file copied in step 4 of “Preparation”.
5. Click “To Step-2”.

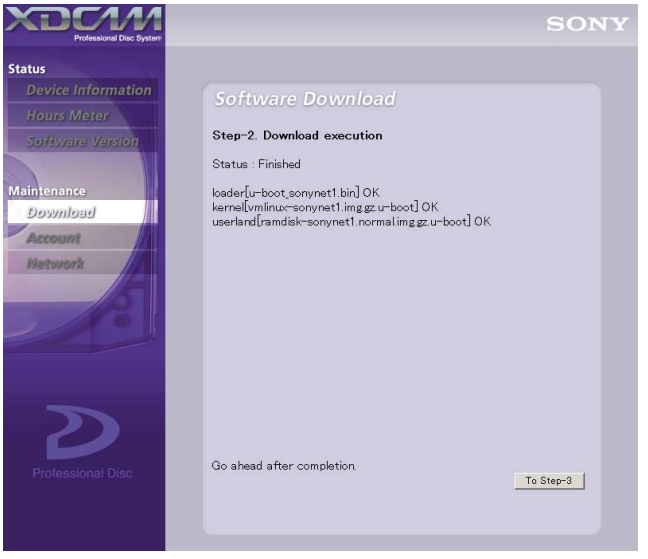


6. When the status turns to “Finished”, check that each firmware program is properly updated or not. (OK or NG)

   Note

   If no change is observed on the download menu for 10 minutes or any firmware program is marked “NG”, the update is failed. In this case, return to step 2 in “Preparation”. If the update is failed again, contact your local Sony Sales Office/Service Center.

7. When “OK” appears for all of the firmware programs, click “To Step-3”.

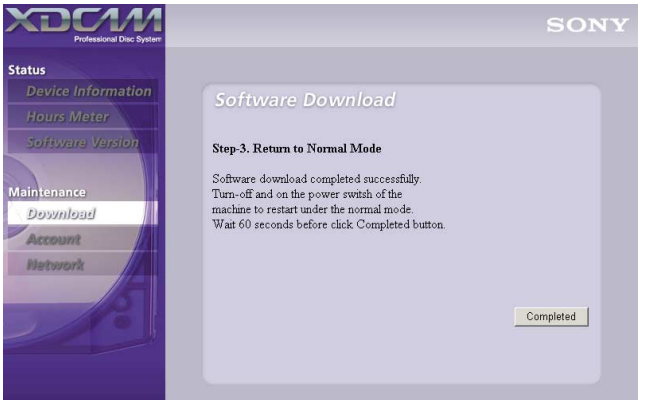


8. Press the ON/Standby switch to set the unit standby once and then press the ON/Standby switch again to set the unit in operating state.
   Wait for 60 seconds in this operating state.

   Note

   When “MENU Ver. UP” appears in the time data display, press the MENU button and then the SET button.

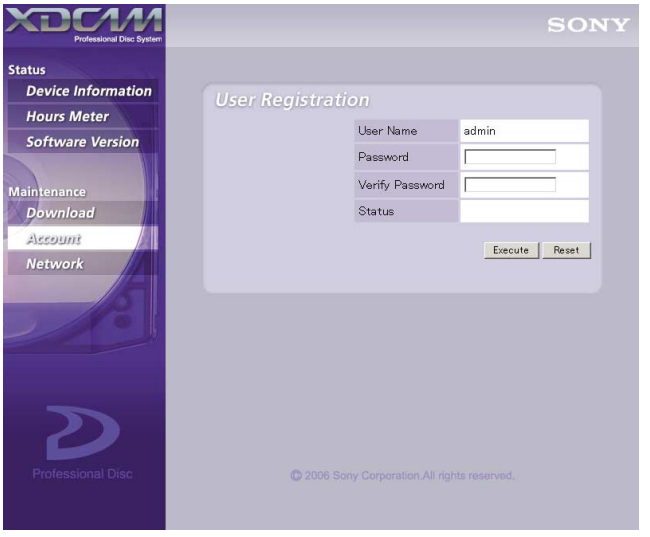
9. Click “Completed”.



10. The window returns to the XDCAM top page and the update is completed.
11. Confirm that NETK and METU are updated in the Software Version page. (Refer to Section 3-2-3.)

3-3-2. Account

The user password for the XDCAM website can be changed on the Account page of the Maintenance menu.



Item		Setting	Function
User Registration	User Name	Display only	Displays the user name.
	Password	8-byte alphanumeric and hyphen *1	New password
	Verify Password	8-byte alphanumeric and hyphen *1	New password (Re-enter the new password for verification.)
	Status	Display only	Success: Displayed when the user password is changed. Error: Displayed when an unusable character is used in the password, the verify password is conflict.

*1: Uppercase and lowercase characters are distinguished.

Procedure

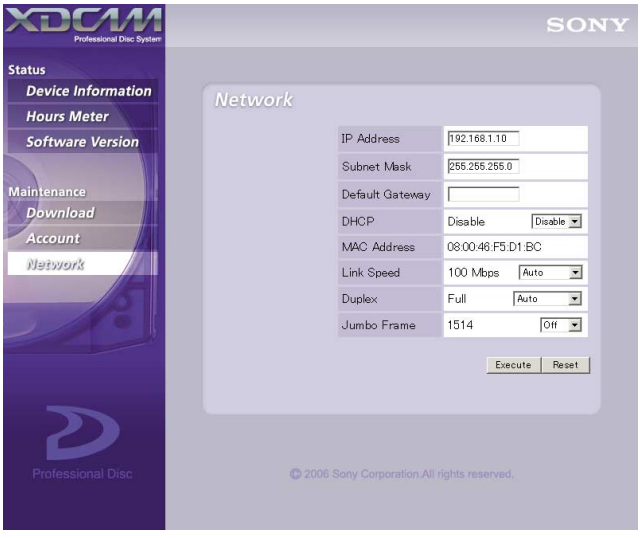
1. Enter the new password in the Password box and Verify Password box. (Pressing “Reset” clears the Input window.)
2. Press “Execute” to change the password.

3-3-3. Network

The network-related settings can be changed on the Network page of the Maintenance menu.

Note

The function is almost the same as that of the NETWORK CONFIG of the MAINTENANCE menu on the unit.



Item	Setting	Default	Function
IP Address	xxx.xxx.xxx.xxx	192.168.1.10	Sets an IP address. (See below.)
Subnet Mask	xxx.xxx.xxx.xxx	255.255.255.0	Sets a subnet mask. (See below.)
Default Gateway	xxx.xxx.xxx.xxx	0.0.0.0	Sets a default gateway. (See below.)
DHCP	Enable/Disable	Disable	Sets whether to automatically acquire an IP address on the DHCP server. Enable: Enables automatic acquisition Disable: Disables automatic acquisition
MAC Address	Display only	—	Displays a MAC address.
Link Speed	AUTO/10Mbps/100Mbps/1000Mbps	Auto	Sets a communication speed.
Duplex	AUTO/Full Duplex/ Half Duplex	Auto	Sets a communication mode. Auto Full duplex Half duplex
Jumbo Frame	Off/4088/9014	Off	Sets a maximum frame size of Ethernet*1. (FCS*2 is not included.) Off: 1514 byte (Factory setting) 4088: 4088 byte 9014: 9014 byte **Note** • Valid only when Link Speed is set to 1000Mbps. All related device on the network need to support it. • When Link Speed is set to 10Mbps or 100Mbps, set to 4088 or 9014, the transmis sion speed becomes slow or the network connection is fail, depending on the network device.

*1: Ethernet is a registered trademark of Xerox Corporation.
*2: Frame Check Sequence

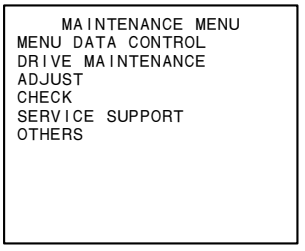
Procedure

1. Enter the IP address (or the subnet mask or the default gateway).
   (Pressing “Reset” clears the Input window.)
2. Press “Execute” to change the setting.

Section 4
Maintenance Mode

4-1. Maintenance Menu Overview

This unit has the MAINTENANCE MENU for unit maintenance.
The MAINTENANCE MENU consists of the following menus. Each menu is superimposed onto the monitor image and time data display areas, and on the monitor connected to this unit.



MENU DATA CONTROL ..... (Section 4-3)
Displays, saves, and reads the SETUP MENU data.

DRIVE MAINTENANCE ..... (Section 4-4)
Used for the maintenance of the optical drive.

ADJUST ..... (Section 4-5)
Used for the free-run frequency adjustment.

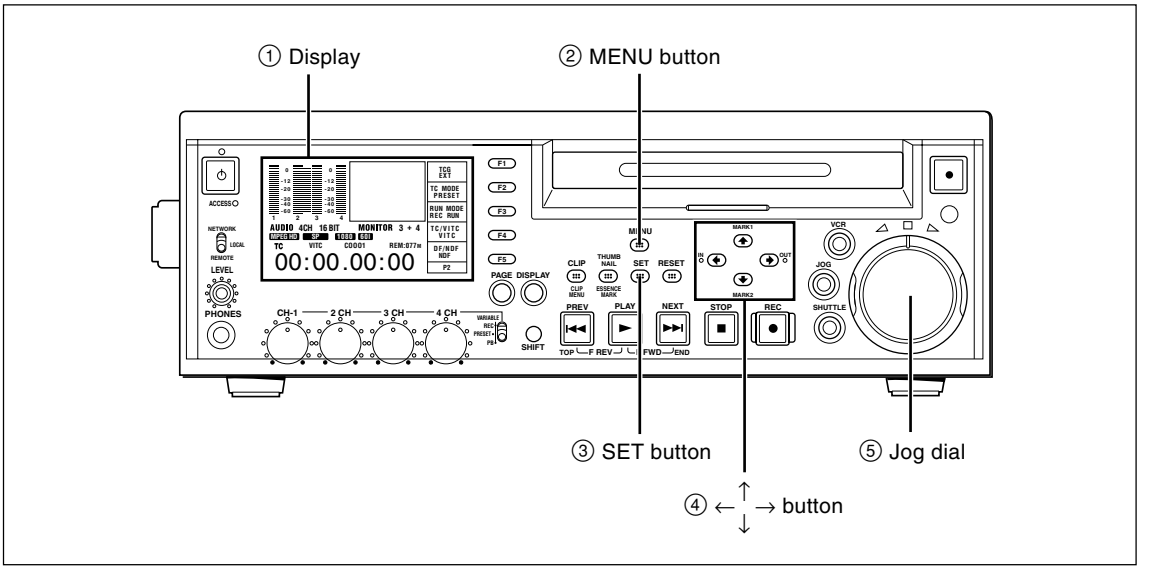
CHECK ..... (Section 4-6)
Checks the keyboard and the setting of the internal video test signals.

SERVICE SUPPORT ..... (Section 4-7)
Displays or deletes the error log.

OTHERS ..... (Section 4-8)
Displays the software version and the serial number of this unit, and formats the Memory Sticks.

Operation Keys

The following are descriptions of the keys used in maintenance mode.



Number	Name	Function
①	Display (LCD)	Displays the menu window selected from a menu.
②	MENU button	Used to start the maintenance menu or display the higher menu hierarchy again.
③	SET button	Used to execute the selected menu or an item in the menu.
④	Cursor button	Moves the cursor (displayed in reverse video) on the display. Also used to change a set value.
⑤	Jog dial	Used to select error log.

Activating the maintenance mode

Press the MENU button while pressing the ← button. The MAINTENANCE MENU appears.

Exiting maintenance mode

Press the MENU button several times.

4-2. Maintenance Menu List

The following lists the items in MAINTENANCE MENU and their factory settings.

Note

F-SET: Factory setting

Menu	Item	Sub Item	Setting	Page
MENU DATA CONTROL	MENU STATUS DISPLAY	—	— (Display only)	4-5
	SAVE MENU DATA	—	—	4-5
	LOAD MENU DATA	—	—	4-6
DRIVE MAINTENANCE (Refer to the next page.)	—	—	—	—
ADJUST	VIDEO	HD f0	—	4-26
		SD f0		
		SDI f0		
CHECK	AUDIO/VIDEO	AUDIO TST SG	Off	4-26
			SILENCE	
			1kHz SINE	
			MULTI	
	KEYBOARD CHECK	—	—	4-27
SERVICE SUPPORT	ERROR LOG	—	—	4-27
	DIAGNOSTICS CONTROL	CLEAR ERROR LOG	—	4-28
OTHERS	SOFTWARE VERSION	—	— (Display only) *1	4-28
	SERIAL NUMBER	—	— (Display only) *2	4-28
	MS FORMAT	—	—	4-30

*1: Displays software version of the unit.
*2: Displays serial number and GUID of the unit.

DRIVE MAINTENANCE

Menu	Item	Sub item	Page
CHECK	DEVICE	TEMPERATURE SENSOR	4-6
		DEW SENSOR	4-7
		FAN MOTOR	4-7
		ACCELERATION SENSOR	4-8
	LOADER		4-9
	SLIDER	AUTO TEST	4-11
		IN-LIM TEST	4-12
		OUT-LIM TEST	4-12
	SPINDLE MOTOR	AUTO TEST	4-13
	OPTICAL BLOCK	FOCUS ACTUATOR	4-14
		TRACKING ACTUATOR	4-14
		EXPANDER MOTOR	4-15
		SKEW SENSOR	4-15
		LASER	4-16
		LC SHUTTER	4-16
	LENS CLEANING		4-17
ADJUST	OPTICAL BLOCK	SET OPTICAL DATA	4-17
		INITIALIZE SE	4-18
	SERVO_1		4-19
	MECHA RD		4-20
	SERVO_2		4-21
	OTHER ADJUST	ACCELERATION OFFSET	4-22
ERROR LOGGER			4-23
OTHERS	VERSION		4-24
	SERIAL NO		4-24
	CLEAR MEDIA LOG		4-25
	MEMORY SUPPORT	UPLOAD TO EEPROM	4-25

4-3. MENU DATA CONTROL

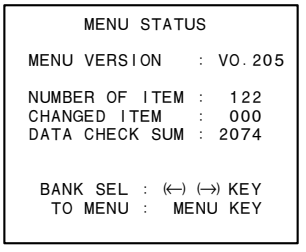
This menu allows to display, save, and read the SETUP MENU data.
Previous settings can be restored with this menu after maintenance or ROM upgrade.

4-3-1. MENU STATUS DISPLAY

Displays the current status of the SETUP MENU data.

Menu hierarchy:

[MENU DATA CONTROL]
→ [MENU STATUS DISPLAY]



MENU VERSION: Version number of the SETUP MENU
NUMBER OF ITEM: Numbers of the SETUP MENU items
CHANGED ITEM: Numbers of the items which were changed from the factory default settings
DATA CHECK SUM: Data check sum

Pressing [→]/[←] button displays the status of the SETUP MENU stored in the menu bank 1 to 3.

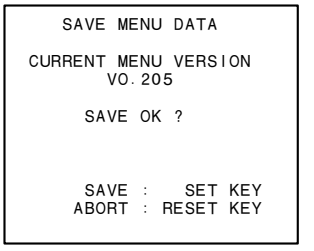
4-3-2. SAVE MENU DATA

This menu allows to save the SETUP MENU settings temporarily before upgrading the EEPROM.

Menu hierarchy:

[MENU DATA CONTROL]
→ [SAVE MENU DATA]

1. The current SETUP MENU version is displayed waiting for entry of the [SET] button.
   Note
   Pressing the [MENU] button returns the display to the higher menu hierarchy without executing the menu.



2. Press the [SET] button.
   The SETUP MENU data is saved in the EEPROM.
   Check that “COMPLETE !!” appears after the data is saved.

Notes

- The saved SETUP MENU data is retained even after power OFF/ON, board replacement or ROM upgrade. However, since the data is stored in the EEPROM on the DPR-270 board, it is lost when the DPR-270 board or EEPROM is replaced.
- When the SETUP MENU version is updated due to ROM upgrade, an alarm message appears after the ROM replacement.
  In that case, initialize SETUP MENU or execute LOAD MENU DATA.

4-3-3. LOAD MENU DATA

This menu allows to read the SETUP MENU settings saved by SAVE MENU DATA.

Menu hierarchy:

[MENU DATA CONTROL]
→ [LOAD MENU DATA]

1. The current SETUP MENU version and the version of SETUP MENU to be read are displayed waiting for entry of the SET button.

   Note

   Pressing the MENU button returns the display to the higher menu hierarchy without executing the menu.

```
      LOAD MENU DATA

  SAVED          CURRENT
  MENU           MENU
 VERSION        VERSION
  0.205 --->     0.205
 (601/UC)       (23.9P/UC)

        LOAD OK ?

        LOAD :    SET KEY
       ABORT :  RESET KEY
```

2. Press the SET button.
   The SETUP MENU data is saved in the EEPROM. Check that “COMPLETE !!” appears after the data is saved.

If failed:

If the SETUP MENU data is not saved or the saved SETUP MENU data is not correct, the read operation is not performed.

4-4. DRIVE MAINTENANCE

Used for the maintenance of the optical drive.

When the DRIVE MAINTENANCE menu is selected, the following screen is displayed.

```
     MAINTENANCE MENU
DRIVE MAINTENANCE

  A DISC INSIDE WILL
  BE EJECTED.

        START OK ?

           OK :    SET KEY
        ABORT :   MENU KEY
```

Pressing the SET button displays MAINTENANCE MENU.
If a cartridge is remaining inside, it is ejected automatically.

4-4-1. TEMPERATURE SENSOR

This menu allows to check the temperature sensor on the optical drive.

Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [DEVICE]
→ [TEMPERATURE SENSOR]

1. A confirmation screen appears waiting for entry of the SET button.

```
   TEMPERATURE SENSOR




      CHECK START?

           OK:  SET KEY
         EXIT: MENU KEY
```

2. Press the SET button.
   The current temperature appears.

```
   TEMPERATURE SENSOR


        39.0 [DEG]




         EXIT: MENU KEY
```

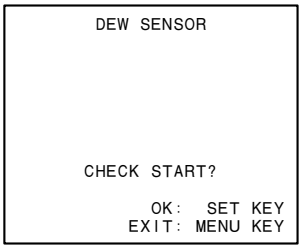
4-4-2. DEW SENSOR

This menu allows to check the dew sensor on the optical drive.

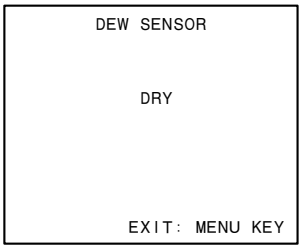
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [DEVICE]
→ [DEW SENSOR]

1. A confirmation screen appears waiting for entry of the SET button.



2. Press the SET button.
The result appears.



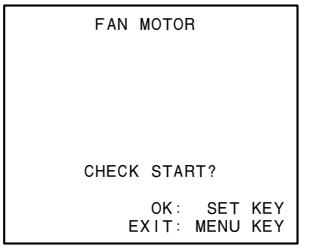
4-4-3. FAN MOTOR

This menu allows to check the fan motor connected to the optical drive.

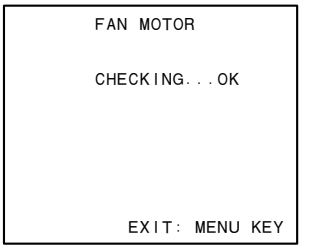
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [DEVICE]
→ [FAN MOTOR]

1. A confirmation screen appears waiting for entry of the SET button.

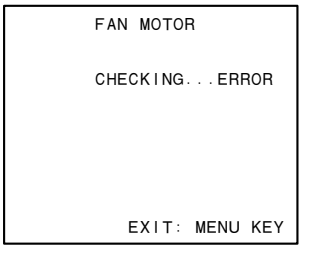


2. Press the SET button.
The result appears.



If failed:

The following screen appears.

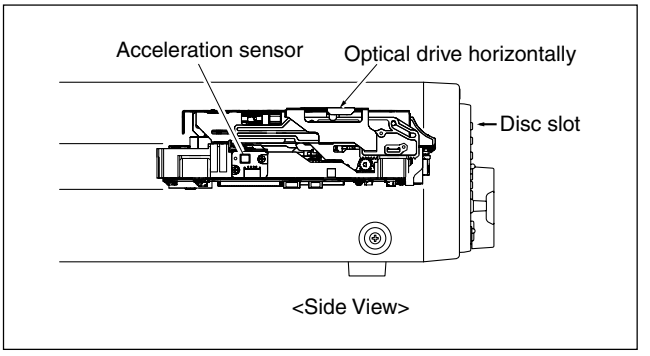


4-4-4. ACCELERATION SENSOR

This menu allows to check the acceleration sensor on the optical drive.

Note

Be sure to place the optical drive horizontally when checking the sensor.
The check may be failed if the optical drive is incorrectly placed.



Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [DEVICE]
→ [ACCELERATION SENSOR]

1. A confirmation screen appears waiting for entry of the SET button.

```
ACCELERATION SENSOR



CHECK START?

      OK:  SET KEY
    EXIT: MENU KEY
```

2. Press the SET button.
   A confirmation screen appears.

```
ACCELERATION SENSOR


PLACE DRIVE
HORIZONTALLY.

ARE YOU SURE?

      OK:  SET KEY
    EXIT: MENU KEY
```

3. Check that the optical drive is placed horizontally, and press the SET button.
   When the optical drive is detected as horizontal, the following screen appears.

```
ACCELERATION SENSOR

     CHECKING...OK
SENSOR POSTURE:OK



          EXIT: MENU KEY
```

If failed:

The following screen appears.
Check optical drive posture and sensor installation.

Note

CHECKING: Disconnection check result
SENSOR POSTURE: SENSOR POSTURE check result
If the disconnection check results in an error, the SENSOR POSTURE check is not carried out.

```
ACCELERATION SENSOR

     CHECKING...OK
SENSOR POSTURE:TILTING!



          EXIT: MENU KEY
```

4-4-5. LOADER

This menu allows to check loader operations.

Note

Check that the loader is correctly installed on the optical drive before starting the check.

Note

If a cartridge is inserted, eject it.

Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [LOADER]

1. A confirmation screen appears waiting for insertion of a cartridge.

```
LOADER

INSERT DISC.

POSITION:EJECT
REC INHI:INHI
DOWN SENSOR:NOT DOWN

EXIT: MENU KEY
```

2. Insert a cartridge.
   The result appears.
   The loader moves to the DOWN position.

```
LOADER

CHECKING...OK

POSITION:DOWN
REC INHI:INHI
DOWN SENSOR:DOWN

NEXT: MENU KEY
```

If failed:

The following screen appears.

```
LOADER

CHECKING...ERROR

POSITION:EJECT
REC INHI:INHI
DOWN SENSOR:NOT DOWN

EXIT: MENU KEY
```

The following describes four procedures:

- Moving DOWN Position to EJECT Position
- Moving DOWN Position to STBY Position
- Moving STBY Position to EJECT Position
- Moving STBY Position to DOWN Position

Moving DOWN Position to EJECT Position

1. Press the MENU button.
   The item selection screen appears.

```
LOADER

MOVE TO EJECT POS →
MOVE TO STBY POS

POSITION:DOWN
REC INHI:INHI
DOWN SENSOR:DOWN
```

2. Press the → button.
   A confirmation screen appears.

```
LOADER

MOVE TO EJECT POS

CHECK START?

OK: SET KEY
EXIT: MENU KEY
```

3. Press the SET button.
   The result appears.
   The loader moves to the EJECT position to eject the cartridge.

```
LOADER

CHECKING...OK

POSITION:EJECT
REC INHI:INHI
DOWN SENSOR:NOT DOWN

EXIT: MENU KEY
```

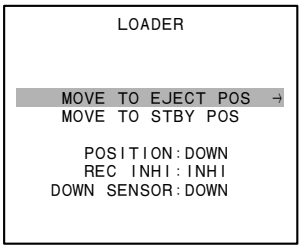
If failed:

The following screen appears.

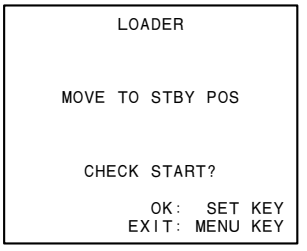
```
LOADER

CHECKING...ERROR

POSITION:DOWN
REC INHI:INHI
DOWN SENSOR:DOWN
```

Moving DOWN Position to STBY Position

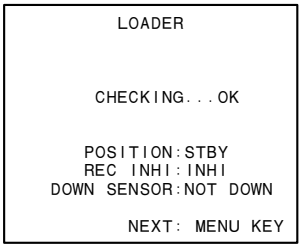
1. Press the MENU button.
   The item selection screen appears.



2. Select “MOVE TO STBY POS” using the ↑/↓ buttons.
3. Press the → button.
   A confirmation screen appears.

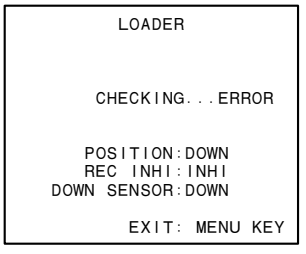


4. Press the SET button.
   The result appears.
   The loader moves to the STBY position.



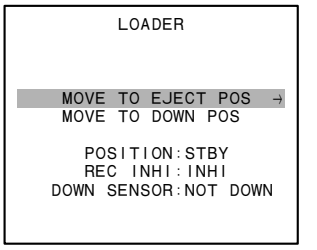
If failed:

The following screen appears.

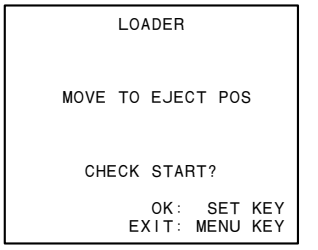


Moving STBY Position to EJECT Position

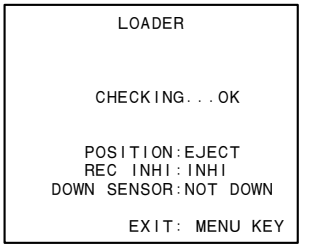
1. Press the MENU button.
   The item selection screen appears.



2. Press the → button.
   A confirmation screen appears.

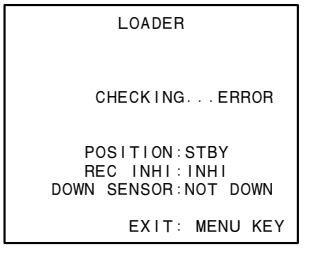


3. Press the SET button.
   The result appears.
   The loader moves to the EJECT position to eject the cartridge.



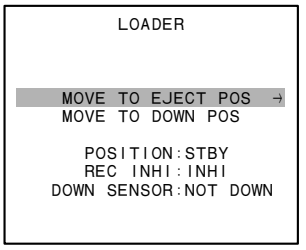
If failed:

The following screen appears.

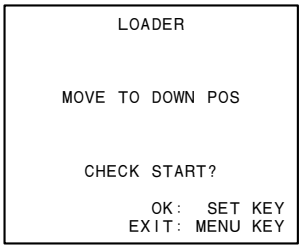


Moving STBY Position to DOWN Position

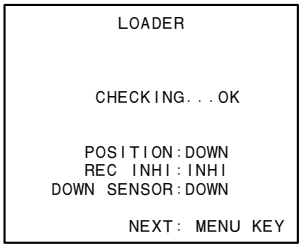
1. Press the MENU button.
   The item selection screen appears.



2. Select "MOVE TO DOWN POS" using the ↑/↓ buttons.
3. Press the → button.
   A confirmation screen appears.

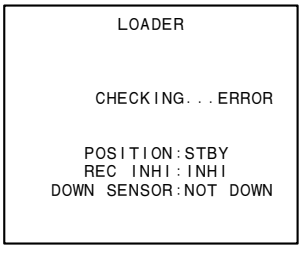


4. Press the SET button.
   The result appears.
   The loader moves to the DOWN position.



If failed:

The following screen appears.



4-4-6. AUTO TEST

This menu allows to check optical block assembly operations and the limit sensor.

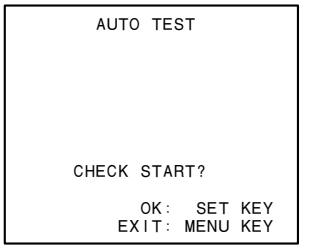
Note

If a cartridge is inserted, eject it.

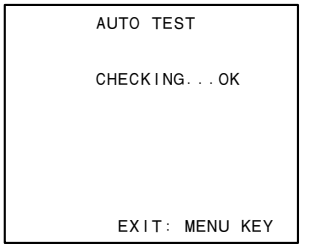
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [SLIDER]
→ [AUTO TEST]

1. A confirmation screen appears waiting for entry of the SET button.

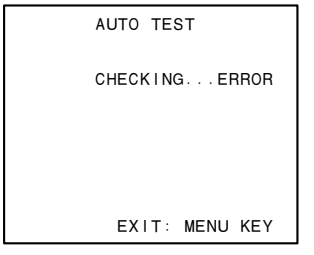


2. Press the SET button.
   The result appears.



If failed:

The following screen appears.



4-4-7. IN-LIM TEST

This menu allows to move the optical block assembly to the inner-limit position of the disc.

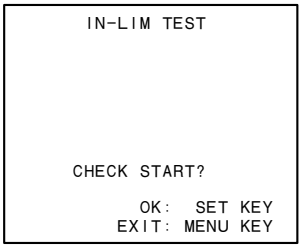
Note

If a cartridge is inserted, eject it.

Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [SLIDER]
→ [IN-LIM TEST]

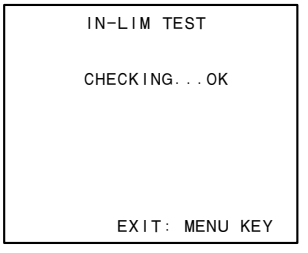
1. A confirmation screen appears waiting for entry of the SET button.



2. Press the SET button.
The result appears.

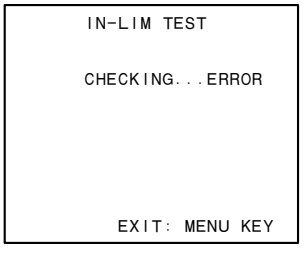
Note

Check visually that the optical block assembly moves to the inner-limit position.



If failed:

The following screen appears.



4-4-8. OUT-LIM TEST

This menu allows to move the optical block assembly to the outer-limit position of the disc.

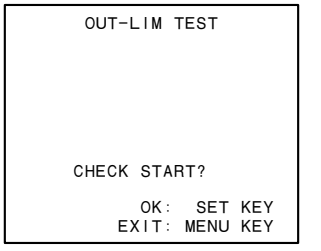
Note

If a cartridge is inserted, eject it.

Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [SLIDER]
→ [OUT-LIM TEST]

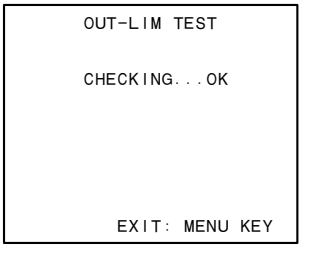
1. A confirmation screen appears waiting for entry of the SET button.



2. Press the SET button.
The result appears.

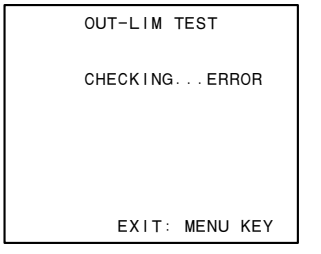
Note

Check visually that the optical block assembly moves to the outer-limit position.



If failed:

The following screen appears.



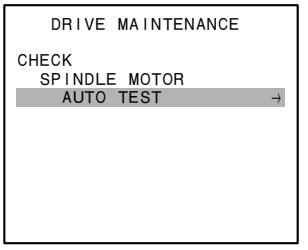
4-4-9. SPINDLE MOTOR

This menu allows to check spindle motor operations.

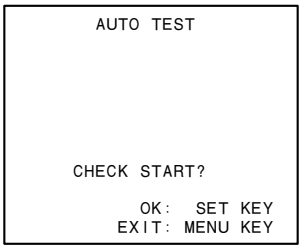
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [SPINDLE MOTOR]

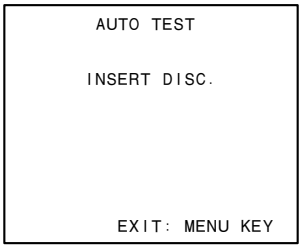
1. Select “AUTO TEST” using the [↑]/[↓] buttons, and press the [→] button.



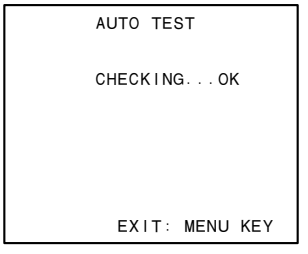
2. A confirmation screen appears waiting for entry of the [SET] button.



3. Press the [SET] button.
A screen to insert a cartridge appears.

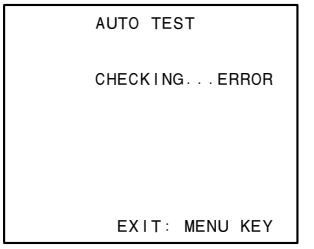


4. Insert a cartridge.
The result appears.



If failed:

The following screen appears.



4-4-10. FOCUS ACTUATOR

This menu allows to check the focus of the 2-axis actuator.

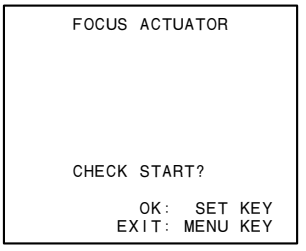
Note

If a cartridge is inserted, eject it.

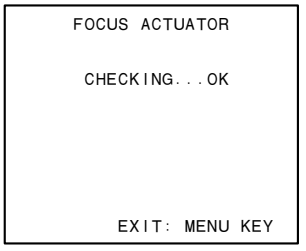
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [OPTICAL BLOCK]
→ [FOCUS ACTUATOR]

1. A confirmation screen appears waiting for entry of the SET button.

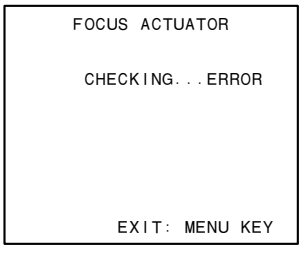


2. Press the SET button.
   The result appears.
   Check that the 2-axis actuator moves up and down several times.
   If the actuator does not move or its movement is not smooth, the harness may be connected improperly or the optical block may be defective.



If failed:

The following screen appears.



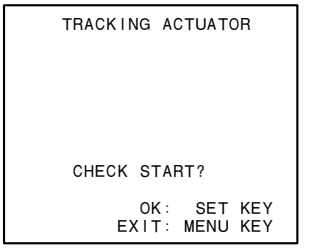
4-4-11. TRACKING ACTUATOR

This menu allows to check the tracking of the 2-axis actuator.

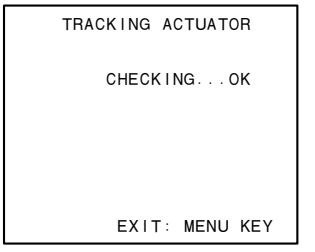
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [OPTICAL BLOCK]
→ [TRACKING ACTUATOR]

1. A confirmation screen appears waiting for entry of the SET button.

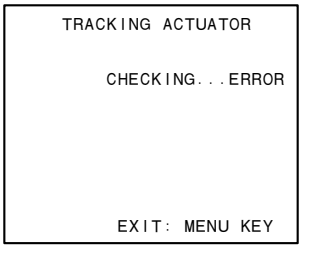


2. Press the SET button.
   The result appears.
   Check that the 2-axis actuator moves up and down several times.
   If the actuator does not move or its movement is not smooth, the harness may be connected improperly or the optical block may be defective.



If failed:

The following screen appears.



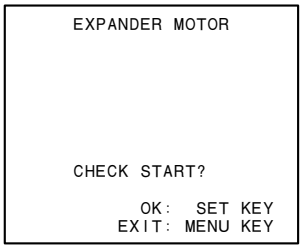
4-4-12. EXPANDER MOTOR

This menu allows to check the expander motor.

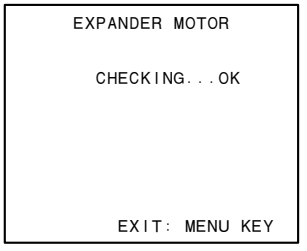
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [OPTICAL BLOCK]
→ [EXPANDER MOTOR]

1. A confirmation screen appears waiting for entry of the SET button.

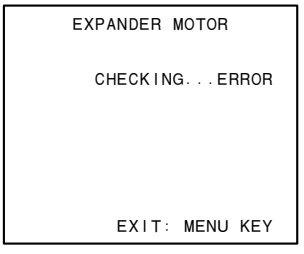


2. Press the SET button.
The result appears.



If failed:

The following screen appears.
The harness may be connected improperly or the optical block may be defective.



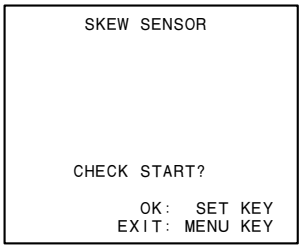
4-4-13. SKEW SENSOR

This menu allows to check the skew sensor.

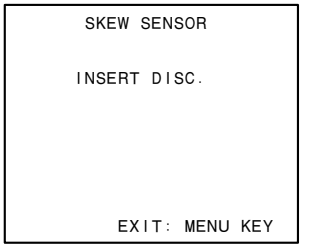
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [OPTICAL BLOCK]
→ [SKEW SENSOR]

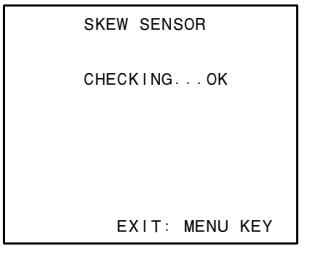
1. A confirmation screen appears waiting for entry of the SET button.



2. Press the SET button.
A screen to insert a cartridge appears.

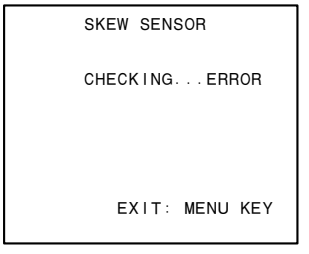


3. Insert a cartridge.
The result appears.



If failed:

The following screen appears.



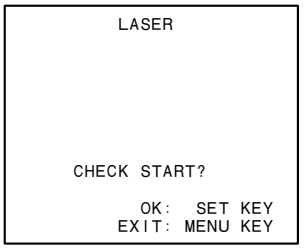
4-4-14. LASER

This menu allows to check the laser.

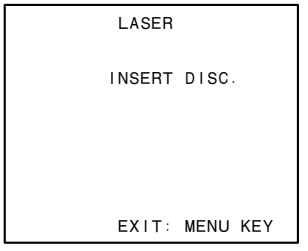
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [OPTICAL BLOCK]
→ [LASER]

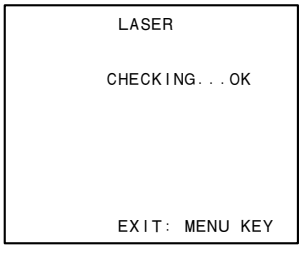
1. A confirmation screen appears waiting for entry of the SET button.



2. Press the SET button.
   A screen to insert a cartridge appears.

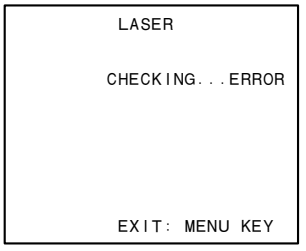


3. Insert a cartridge.
   The result appears.



If failed:

The following screen appears.



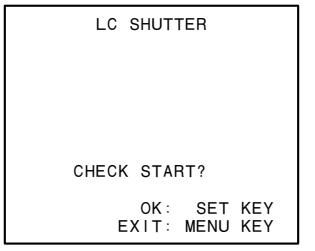
4-4-15. LC SHUTTER

This menu allows to check the LC shutter.

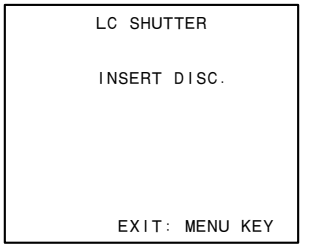
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [OPTICAL BLOCK]
→ [LC SHUTTER]

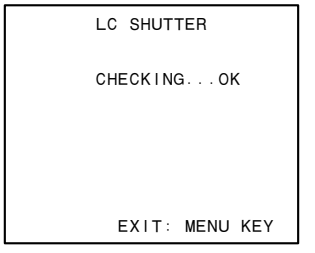
1. A confirmation screen appears waiting for entry of the SET button.



2. Press the SET button.
   A screen to insert a cartridge appears.

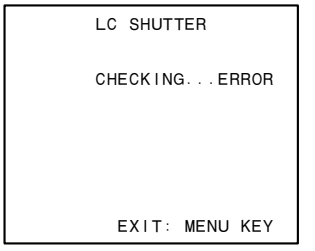


3. Insert a cartridge.
   The result appears.



If failed:

The following screen appears.



4-4-16. LENS CLEANING

This menu allows to clean the lens.

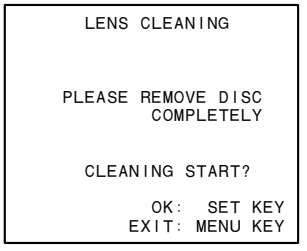
Note

Before cleaning, be sure to unload the disc from the unit. If the disc remains at the loading slot, cleaning will not be finished completely.

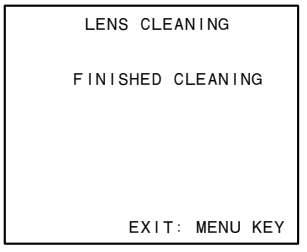
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [CHECK]
→ [LENS CLEANING]

1. A confirmation screen appears waiting for entry of the SET button.



2. Check that no disc is remaining, and then press the SET button.
   The result appears.



4-4-17. SET OPTICAL DATA

This menu allows to update the barcode information written in the optical drive.

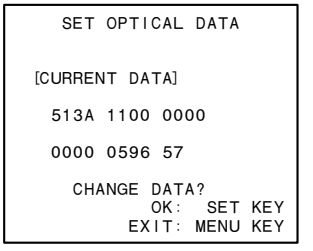
Note

The 1st to 6th digit and 14 to 20th digit values of the 22-digit barcode data are saved as actual adjustment data. The other values are additional data used to detect wrong input. For this reason, there may be different additional data when reconfirming after the barcode data is updated.

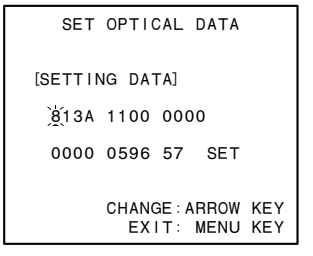
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [ADJUST]
→ [OPTICAL BLOCK]
→ [SET OPTICAL DATA]

1. A confirmation screen appears waiting for entry of the SET button.



2. Press the SET button.
   A modifiable point blinks and the cursor appears.



3. Repeat the following procedure to modify the barcode information to the new one attached on the optical block assembly.
   (1) Move the cursor to the point to be modified using the →/← buttons.
   (2) Modify the value of the point using the ↑/↓ buttons.
4. Select "SET" using the →/← buttons, and press the SET button.
   A confirmation screen appears.

```
    SET OPTICAL DATA

[NEW DATA]
  5440 3200 0000
  0000 0371 72
        SAVE?
         SAVE:  SET KEY
         EXIT: MENU KEY
```

5. Press the SET button.
   The result appears.

```
    SET OPTICAL DATA

[NEW DATA]
  5440 3200 0000
  0000 0371 72
  SAVING...COMPLETED
          EXIT: MENU KEY
```

If failed:

The following screen appears.
Check whether the entered value is correct.

```
    SET OPTICAL DATA

[NEW DATA]
  5440 3200 0000
  0000 0371 72
  SAVING...FAILED
          EXIT: MENU KEY
```

4-4-18. INITIALIZE SE

This menu allows to set a default value to control the laser output.

Note

Perform this setting only after the optical block assembly replacement.

Menu hierarchy:

[DRIVE MAINTENANCE]
→ [ADJUST]
→ [OPTICAL BLOCK]
→ [INITIALIZE SE]

1. A confirmation screen appears waiting for entry of the SET button.

```
       INITIALIZE SE



       ADJUST START?

            OK:  SET KEY
          EXIT: MENU KEY
```

2. Press the SET button.
   A confirmation screen appears.

```
       INITIALIZE SE


EXECUTE ONLY AFTER
REPLACING OPTICAL BLOCK.

       ARE YOU SURE?

            OK:  SET KEY
          EXIT: MENU KEY
```

3. Press the SET button.
   A screen to insert a cartridge appears.

```
       INITIALIZE SE


       INSERT DISC.



          EXIT: MENU KEY
```

4. Insert a cartridge.
   The result appears.

```
INITIALIZE SE

ADJUSTING...COMPLETED


EXIT: MENU KEY
```

If failed:

The following screen appears.
Check the connection to the optical block assembly.

```
INITIALIZE SE

ADJUSTING...FAILED


EXIT: MENU KEY
```

4-4-19. SERVO_1

This menu allows to adjust the offset and gain of the signal circuit for servo error detection.

Menu hierarchy:

[DRIVE MAINTENANCE]
→ [ADJUST]
→ [SERVO_1]

1. A confirmation screen appears waiting for entry of the SET button.
   Note
   This screen does not appear when the loader assembly is removed.

```
SERVO_1


ADJUST START?

OK:  SET KEY
EXIT: MENU KEY
```

2. Press the SET button.
   A confirmation screen appears.

```
SERVO_1

INSERT ALIGNMENT DISC
PFD23-RS.


EXIT: MENU KEY
```

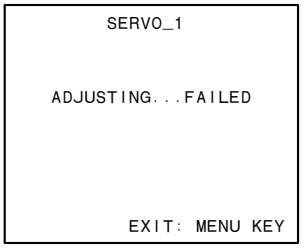
```
SERVO_1

SET ALIGNMENT DISC
PFD23-RS.

ADJUST START?

OK:  SET KEY
EXIT: MENU KEY
```

3. Insert or set a cartridge.
   The result appears.

```
SERVO_1

ADJUSTING...COMPLETED


EXIT: MENU KEY
```

If failed:

The following screen appears.



4-4-20. MECHA RD

This menu describes each movement of the optical block assembly for RD check and adjustment.

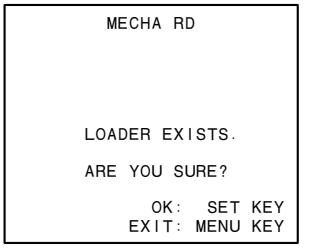
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [ADJUST]
→ [MECHA RD]

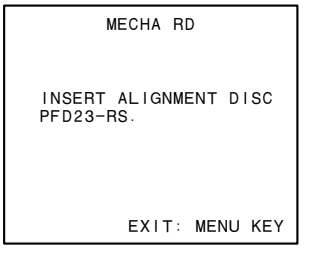
1. A confirmation screen appears waiting for entry of the SET button.

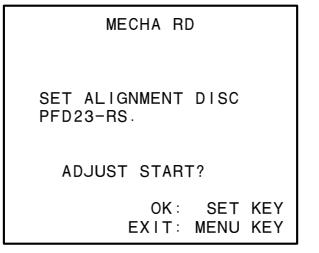
   Note

   This screen does not appear when the loader assembly is removed.



2. Press the SET button.
   A confirmation screen appears.

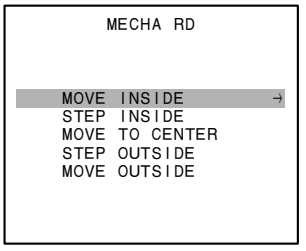




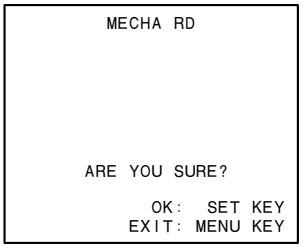
3. Insert or set a cartridge.
   The item selection screen appears.

   Note

   MOVE INSIDE: Moves to the inner limit of the disc.
   STEP INSIDE: Moves slightly in the inner circumference direction.
   MOVE TO CENTER: Moves to the mid-circumference of the disc.
   STEP OUTSIDE: Moves slightly in the outer circumferential direction.
   MOVE OUTSIDE: Moves to the outer limit of the disc.



4. Select each item using the [↑]/[↓] buttons, and press the [→] button.
   A confirmation screen appears.



5. Press the [SET] button.
   The optical block assembly moves according to the selected item.
   When the movement is completed normally, the screen in step 3 appears.

4-4-21. SERVO_2

This menu allows to adjust SKEW OFFSET, TE/CE BLOCK, and SV LOOP GAIN necessary for servo operation.

Note

Be sure to install the loader. The adjustments are not available if the loader is not installed.

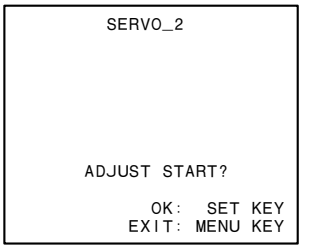
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [ADJUST]
→ [SERVO_2]

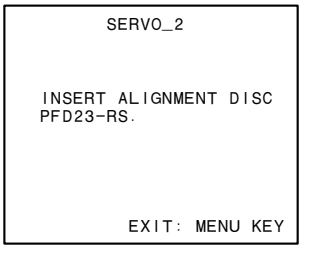
1. A confirmation screen appears waiting for entry of the [SET] button.

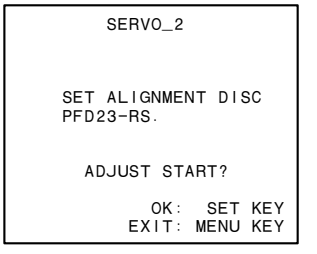
   Note

   This screen does not appear when the loader assembly is removed.

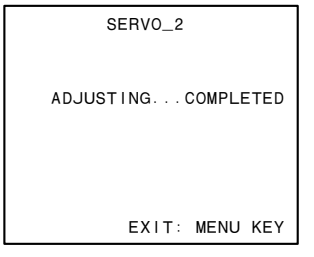


2. Press the [SET] button.
   A confirmation screen appears.





3. Insert or set a cartridge.
   The result appears.



If failed:

The following screen appears.

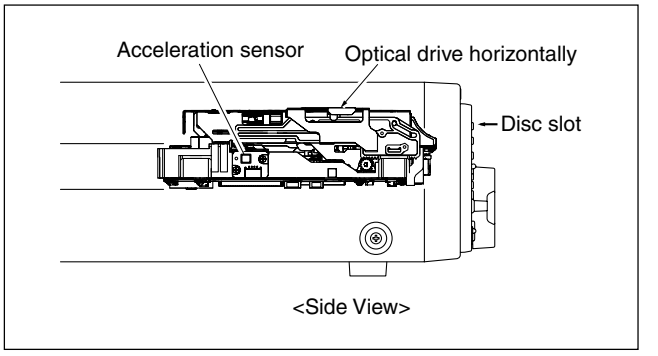
```
SERVO_2

ADJUSTING...FAILED


EXIT: MENU KEY
```

4-4-22. ACCELERATION OFFSET

This menu allows to perform the offset adjustment of the acceleration sensor.

Note

Be sure to place the optical drive horizontally when adjusting the sensor.
The servo operation is not ensured if the optical drive is incorrectly placed.



Menu hierarchy:

[DRIVE MAINTENANCE]
→ [ADJUST]
→ [OTHER ADJUST]
→ [ACCELERATION OFFSET]

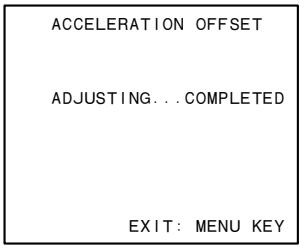
1. A confirmation screen appears waiting for entry of the SET button.

```
ACCELERATION OFFSET


ADJUST START?

OK:  SET KEY
EXIT: MENU KEY
```

2. Press the SET button.
The result appears.

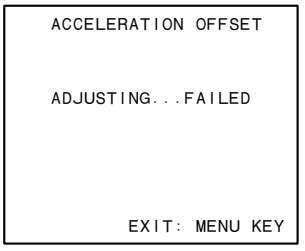
```
ACCELERATION OFFSET


PLACE DRIVE
HORIZONTALLY.

ARE YOU SURE?

OK:  SET KEY
EXIT: MENU KEY
```

3. Press the SET button.
   A confirmation screen appears.



If failed:

The following screen appears.



4-4-23. ERROR LOGGER

This menu allows to delete registered error logs.

Notes

- DRIVE ERROR and DRIVE WARNING are recorded.
- Up to 16 pieces of log data are displayed.
  The following data is overwritten on the existing data from the oldest.

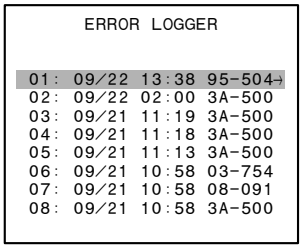
Menu hierarchy:

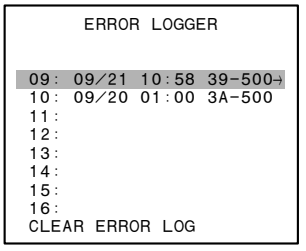
[DRIVE MAINTENANCE]
→ [ERROR LOGGER]

1. Select a desired error number using the ↑/↓ buttons.

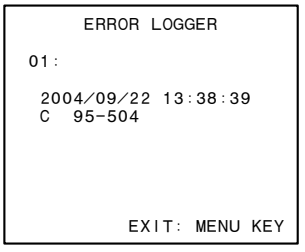
   Note

   To change the display to the next screen, keep pressing the ↓ button.



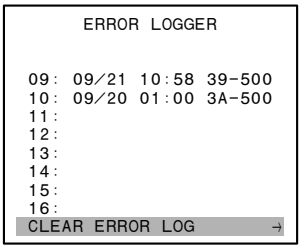


2. Press the → button.
   Detailed information of the selected error appears.

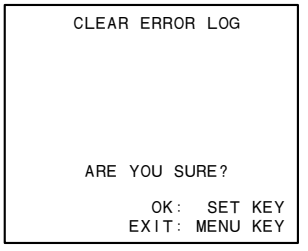


Clearing Error Log

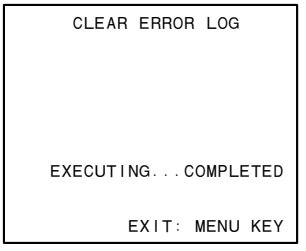
1. Display the error log list.
2. Select “CLEAR ERROR LOG” using the [↑]/[↓] buttons.



3. Press the [→] button.
   A confirmation screen appears.

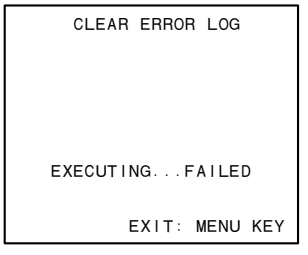


4. Press the [SET] button.
   The result appears.



If failed:

The following screen appears.

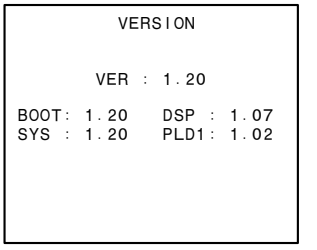


4-4-24. VERSION

This menu displays the version of the optical drive.

Menu hierarchy:

[DRIVE MAINTENANCE]
→ [OTHERS]
→ [VERSION]

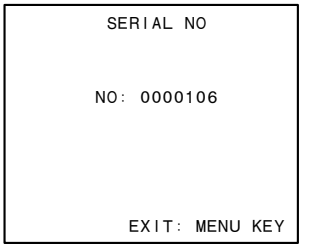


4-4-25. SERIAL NO

This menu displays the serial number of the optical drive.

Menu hierarchy:

[DRIVE MAINTENANCE]
→ [OTHERS]
→ [VERSION]



4-4-26. CLEAR MEDIA LOG

This menu allows to delete the log of media.

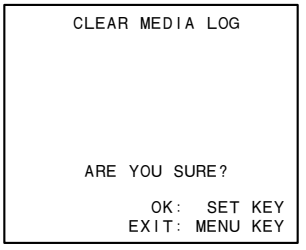
Note

Once deleted, the deleted log cannot be restored.

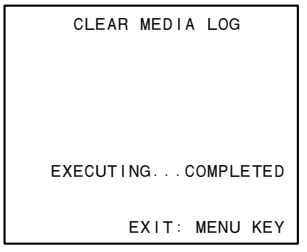
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [OTHERS]
→ [CLEAR MEDIA LOG]

1. A confirmation screen appears waiting for entry of the SET button.

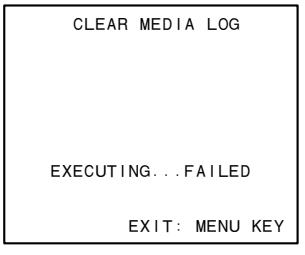


2. Press the SET button.
The result appears.



If failed:

The following screen appears.
The EEPROM (IC603) on the DR-550G board may be defective.



4-4-27. UPLOAD TO EEPROM

This menu allows to update the EEPROM (IC603) information backed up on the DR-550G board when only IC603 is replaced.

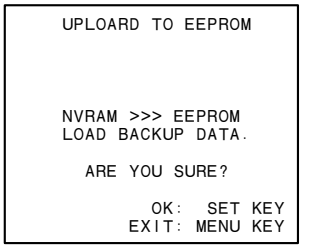
Note

When replacing the DR-550G board, remove the EEPROM (IC603) from the board, and then mount it on the new board. This menu is not necessary.
Execute this menu only when IC603 is replaced solely.

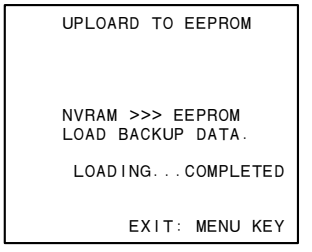
Menu hierarchy:

[DRIVE MAINTENANCE]
→ [OTHERS]
→ [MEMORY SUPPORT]
→ [UPLOAD TO EEPROM]

1. A confirmation screen appears waiting for entry of the SET button.

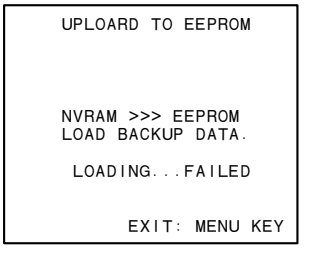


2. Press the SET button.
The result appears.



If failed:

The following screen appears.



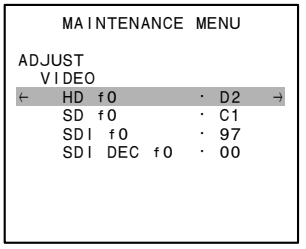
4-5. ADJUST

4-5-1. VIDEO

Used for the free-run frequency adjustment.

Menu hierarchy:

[ADJUST]
→ [VIDEO]



HD f0: Adjust the HD free-run frequency. (Refer to Section 8-2.)
SD f0: Adjust the SD free-run frequency. (Refer to Section 8-3.)
SDI f0: Adjust the SDI ENC free-run frequency. (Refer to Section 8-4.)
SDI DEC f0: Adjust the SDI DEC free-run frequency. (PDBK-104 installed only) (Refer to Section 8-5.)

4-6. CHECK

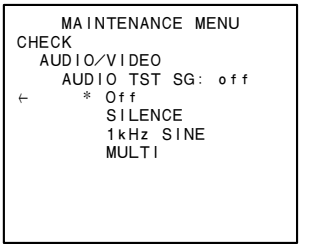
Checks the keyboard and the setting of the internal video test signals.

4-6-1. AUDIO TST SG

This menu allows you to select output of the test signal generator built in this unit.

Menu hierarchy:

[CHECK]
→ [AUDIO/VIDEO]
→ [AUDIO TST SG]



Off: Stops the operation of the internal test signal generator. (factory setting)
SILENCE: Generates a mute signal with the internal test signal generator.
1kHz: Generates a 1 kHz signal with the internal test signal generator.
MULTI: Generates a signal which differs in frequency between channels with the internal test signal generator.

4-6-2. KEYBOARD CHECK

This menu allows to check the buttons in the Control Panel and the LEVEL knob.

Menu hierarchy:

[CHECK]
→ [KEYBOARD CHECK]

```
     KEYBOARD CHECK

REMOTE     : LOCAL
AUDIO VOL  : PRESET
           : 00 00 00 00
PHONE VOL  : 00


KEY INPUT  :


     TO MENU : MENU KEY
```

Item	Setting	Description
REMOTE	—	Operation checks of the NETWORK/ LOCAL/REMOTE switches
AUDIO VOL	00 - FF	Operation checks of the REC/ PRESET/PB switches and the LEVEL knob
PHONE VOL	00 - FF	Operation check of the headphone VOL
KEY INPUT	—	Operation checks of the buttons in the Control Panel

4-7. SERVICE SUPPORT

Displays or deletes the error log.

4-7-1. ERROR LOG

This menu displays registered error logs.
For details, refer to “Section 2 Error Messages”.

Menu hierarchy:

[SERVICE SUPPORT]
→ [ERROR LOG]

1. Select an error log using the [↑]/[↓] buttons, and press the [→] button.

```
    MAINTENANCE MENU
SERVICE SUPPORT
  ERROR LOG
                    (001/008)
←   001 ERROR-95-101   →
    002 ERROR-95-101
    003 ERROR-95-504
    004 ERROR-95-504
    005 ERROR-95-101
    006 ERROR-95-101
    007 ERROR-95-101
    008 ERROR-95-101
```

2. Then the error log details appear.

Notes

- Turning the jog dial clockwise displays the latest error log details.
- Turning the jog dial counterclockwise displays the old error log details.

```
        ERROR LOG

ERROR: 95-101  (001/008)

DATE : 09/16 09:39:32
TC   : 00:00:00:00


   2004/09/18 05:47:36

    NEXT/PREV : JOG DIAL
      TO MENU : MENU KEY
```

4-7-2. DIAGNOSTICS CONTROL

This menu allows to delete registered error logs.

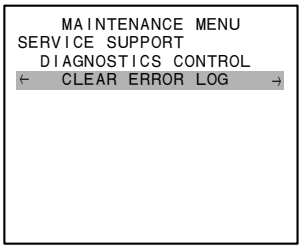
Note

Generally, do not delete the error logs.
The error logs contain important information helpful for resolving or avoiding problems.

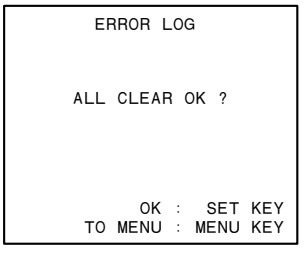
Menu hierarchy:

[SERVICE SUPPORT]
→ [DIAGNOSTICS CONTROL]

1. Press the [→] button.



2. A confirmation screen appears.
   Press the [SET] button.
   The error log is deleted and the screen shown in step 1 appears.



4-8. OTHERS

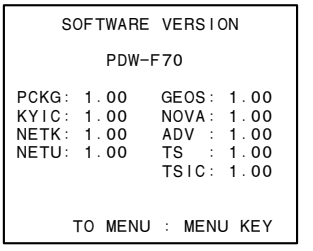
Displays the software version and the serial number of this unit, and formats the Memory Sticks.

4-8-1. SOFTWARE VERSION

This menu allows you to confirm main versions of the ROMs used in this unit. When option boards are installed, their ROM versions can also be confirmed.

Menu hierarchy:

[OTHERS]
→ [SOFTWARE VERSION]



PCKG: Shows the integrated version of specific versions of the ROM packages.
KYIC: Version of the ROM (IC201) for IC200 on the KY-580 board
GEOS: Version of IC1100 on the DPR-270 board
NOVA: Version of IC400 on the DPR-270 board

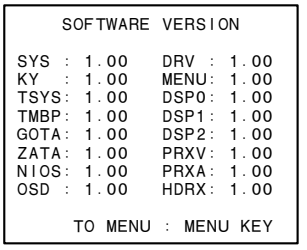
(PDBK-101 is installed)
NETK: Version of the ROM (IC401) for IC200 on the NET-1 board
NETU: Version of the ROM (IC401) for IC200 on the NET-1 board

(PDBK-103/104 is installed)
ADV: Version of the ROM (IC301) for IC300 on the ADC-50 board

(PDBK-102 is installed)
TS: Version of the ROM (IC705) for IC700 on the TSI-54 board
TSIC: Version of the ROMs (IC201, IC303 and IC706) for IC200, IC300 and IC700 on the TSI-54 board

Displaying Specific Versions of ROM Packages

1. Press the [→] button on the ROM main version window.
   The ROM package specific version window opens.


SOFTWARE VERSION
SYS : 1.00 DRV : 1.00
KY : 1.00 MENU: 1.00
TSYS: 1.00 DSP0: 1.00
TMBP: 1.00 DSP1: 1.00
GOTA: 1.00 DSP2: 1.00
ZATA: 1.00 PRXV: 1.00
NIOS: 1.00 PRXA: 1.00
OSD : 1.00 HDRX: 1.00
TO MENU : MENU KEY

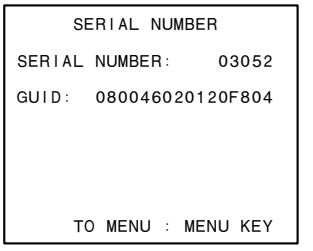
SYS: Shows the version of ROM (IC1909, IC1910) on IC1900/DPR-270 board.
KY: Shows the version of ROM (IC602) on IC501/KY-580 board.
TSYS: Shows the version of ROM (IC1909, IC1910/DPR-270 board) on IC100/ENC-101 board.
TMBP: Shows the version of ROM (IC1909, IC1910/DPR-270 board) on IC100/ENC-101 board.
GOTA: Shows the version of ROM (IC1909, IC1910) on IC2500/DPR-270 board.
ZATA: Shows the version of ROM (IC1909, IC1910) on IC2900/DPR-270 board.
NIOS: Shows the version of ROM (IC1909, IC1910) on IC400/DPR-270 board.
OSD: Shows the version of ROM (IC1909, IC1910) on IC400/DPR-270 board.
DRV: Shows the version of ROM (IC602) on IC600/DR-550G board.
MENU: Shows the version of ROM (IC1909, IC1910) on IC1900/DPR-270 board.
DSP0: Shows the version of ROM (IC1909, IC1910) on IC1500/DPR-270 board.
DSP1: Shows the version of ROM (IC1909, IC1910) on IC1502/DPR-270 board.
DSP2: Shows the version of ROM (IC1909, IC1910) on IC1501/DPR-270 board.
PRXV: Shows the version of ROM (IC1909, IC1910) on IC1700/DPR-270 board.
PRXA: Shows the version of ROM (IC1909, IC1910) on IC1600/DPR-270 board.
HDRX: Shows the version of ROM (IC103) on IC300/RX-93 board.

2. Press the [←] button.
   The main ROM version window opens.

4-8-2. SERIAL NUMBER

This menu displays the serial number and GUID of this unit.

Menu hierarchy:
[OTHERS]
→ [SERIAL NUMBER]



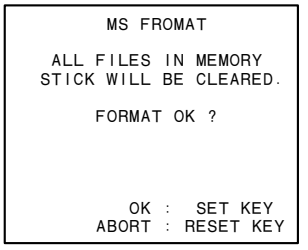
4-8-3. MS FORMAT

This menu allows you to format the Memory Stick used for firmware update.
A directory for firmware update is automatically created during the formatting process.

Menu hierarchy:

[OTHERS]
→ [MS FORMAT]

1. A confirmation screen appears prompting a press of the SET button.

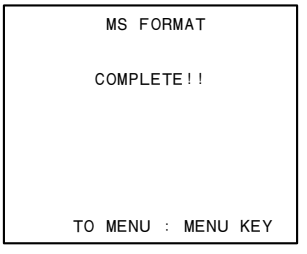


2. Press the SET button.
   The Memory Stick formatting starts.

   Notes

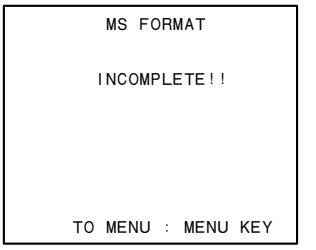
   - Do not remove the Memory Stick during formatting.
   - If no Memory Stick is inserted, “NO MEMORY STICK!!” appears.
   - The formatting operation requires about one minute for a 64-MB Memory Stick.

3. “COMPLETE!!” appears upon completion of the formatting.



If failed:

The following screen appears.
“The Memory Stick may be a type that is not available for this unit.”



Section 5
Periodic Check and Maintenance

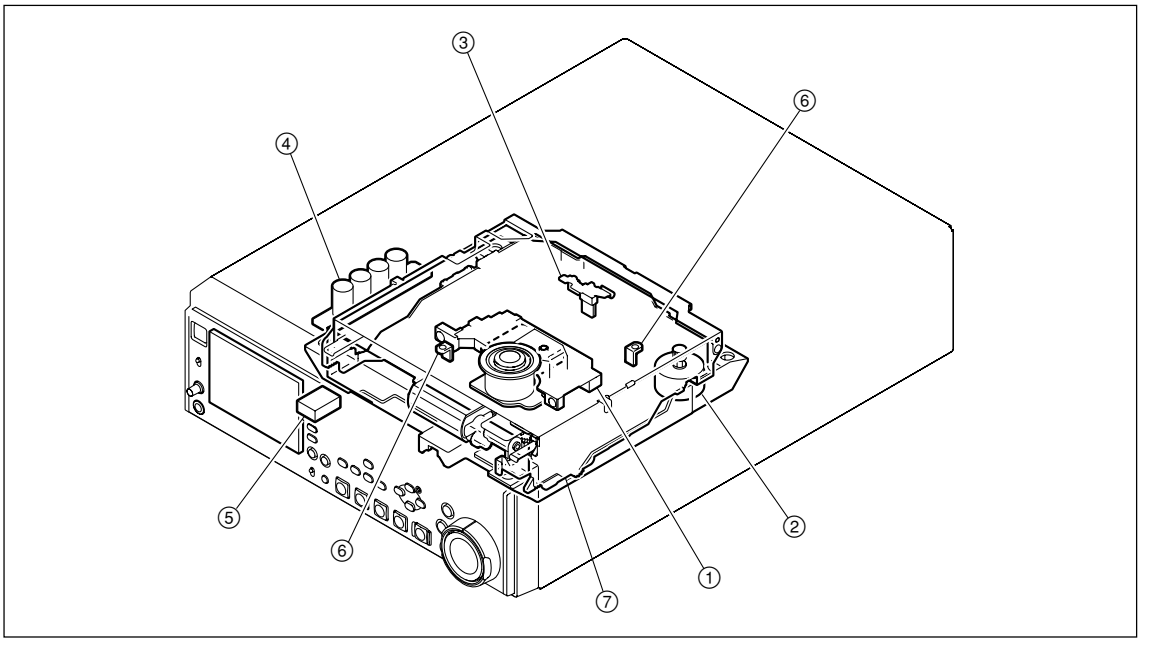
This section explains about periodic maintenance and how to clean.

5-1. Periodic Maintenance

To make the most of the functions, fully realize the performances of this unit and to lengthen the life of the unit, periodic check and parts replacement are recommended.

5-1-1. Index

It is necessary to check and replace periodically to the following parts.
The numbers in the illustration correspond to the table in the Section 5-1-3.



5-1-2. Digital Hours Meter

The elapsed operation time or count of the unit is displayed.
Use this digital hours meter as a guide to periodic check/replacement.

Displaying Digital Hours Meter

1. Display the system menu with the MENU button.
2. Select "HOURS METER" with the ↑/↓ button, and press the SET button.

Display contents

Menu No.	Item	Display content
H1	OPERATION	The total number of hours the unit has been powered on (unit: hour, resettable)
H2	LASER PARAMETER	The light output count for the optical head* (resettable)
H3	SEEK RUNNING	The cumulative seek operation time for the optical head (unit: hour, resettable)
H4	SPINDLE RUNNING	The cumulative spindle rotation time for the optical head (unit: hour, resettable)
H5	LOADING COUNTER	The total number of times the disc has been loaded (resettable)

* : Increment of the counter depends on recording/playback ratio and operating temperature.

5-1-3. Periodic Check/Replacement Parts List

This table does not describe the guarantee period of each part.
The replacement period of each part is changed according to the environment and condition.

No.	Part to Be Replaced	Hours Meter (Menu item)	Check/Replacement Period	Parts Number and Name	Section
①	Optical block assembly	Laser parameter (LASER PARAMETER)	Replace every 6000.	⚠ A-1139-275-A KES-110A (RP)	6-10
②	Seek motor	Seek running hours (SEEK RUNNING)	Replace every 12000 H.	A-1097-729-B Seek motor (P10) assembly	6-12
③	Cleaner (P1) assembly	Laser parameter (LASER PARAMETER)	Check every 6000. Replace when bristles of brush become sparse or damaged remarkably.	A-8347-266-B Cleaner (P1) assembly	6-6
④	EM-5 board	Laser parameter (LASER PARAMETER)	Replace around the same time as optical block assembly.	A-1201-481-A	6-17-5
⑤	Lithium battery (for NVRAM)	Current-carrying hours (OPERATION)	About 10 years	⚠ 1-767-156-11 M4T28-BR12SH1	1-14
⑥	Cushion	Laser parameter (LASER PARAMETER)	Check every 6000. Replace when cushion is deteriorated in shape.	3-796-308-02 Cushion	6-14
⑦	Loader (P1) assembly	Disc loading count* (LOADING)	Replace every 85,000 times.	A-1147-155-A P1 loader assembly (RP)	6-5

* : This count differs from the actual disc insertion times because the loader up/down count is made by the normal loading operation.

5-2. Cleaning

To make the most of the functions, fully realize the performance of this unit, and to lengthen the life of the unit and cartridge, clean the components often.

5-2-1. General Information for the Use of Cleaning Cloth

1. Cautions

- Be sure turn the power off before cleaning.
- Each block in the drive consists of precision parts and is adjusted precisely. Be careful not to damage the parts and to apply excessive force during cleaning.
- Do not touch the oiled portions during cleaning. If oil adheres to cleaning cloth, replace the cleaning cloth with a new one. If a cleaning cloth smeared with oil is used, oil may adhere to the places where it should not.
- Do not insert a cartridge before cleaning fluid completely evaporates after cleaning.

2. Preparation

(1) Turn the power off.
(2) Remove the top plate. (Refer to Section 1-9-1.)
(3) Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
(4) Remove the loader (P1) assembly. (Refer to Section 6-5.)

5-2-2. Cleaning Loader (P1) Assembly

Precautions

The loader (P1) assembly consists of precision parts. Be careful not to damage and give excessive force to the parts.

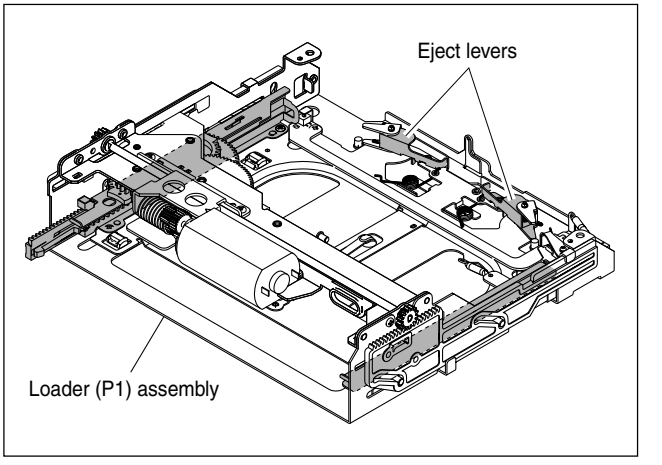
Cleaning Procedure

Tools

- Cleaning cloth (or cotton swab)
- Cleaning fluid (alcohol)

Procedure

1. Clean both sides and the eject levers in the loader (P1) assembly using the cleaning cloth (or cotton swab) with the cleaning fluid soaked.



5-2-3. Cleaning Drive (P10) Sub Assembly

Precautions

- To prevent the possibility of damage to the optical block assembly in the drive by static electricity charged in a human body or clothes, be sure to establish a ground before cleaning the drive assembly.
  (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits. Keep magnetic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If the magnetic substance is moved close to these parts, their characteristics may be changed.
- The drive assembly consists of precision parts.
  Be careful not to damage and give excessive force to the parts.
- While cleaning, be careful not to touch the portions where oil is applied (slide shafts).
  If oil is attached to the cleaning cloth, replace it with a new one.
  Otherwise, it may attach to an unnecessary part.

Cleaning Procedure

Tools

- Cleaning cloth (or cotton swab)
- Cleaning fluid (alcohol)

Procedure

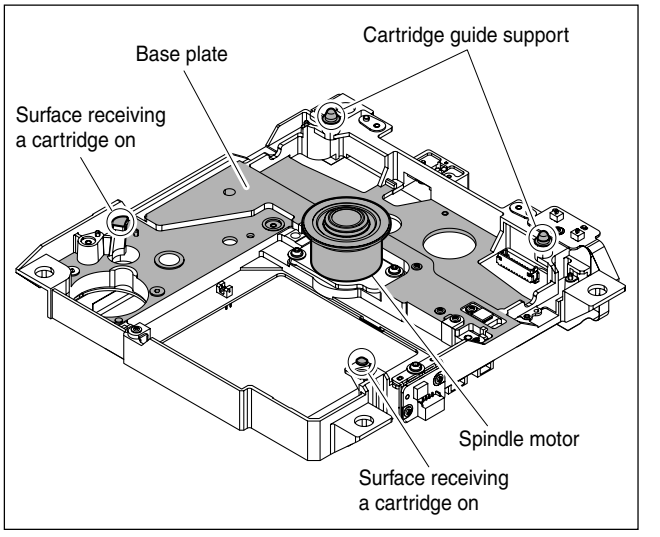
1. Remove dust and dirt attached on the following parts shown in the figure, using the cleaning cloth (or cotton swab) with the cleaning fluid soaked.

Where to clean

- Cartridge guide supports (two points)
- Surfaces receiving a cartridge on (two points)
- Spindle motor
- Base plate

Note

After the cleaning, ensure that fibers of the cleaning cloth (or cotton swab) are not attached on the spindle motor.



5-2-4. Cleaning Pickup Lens

Error codes “02-020” may be displayed due to smudged lens.
If “02-020” is displayed, be sure to clean the pickup lens referring to “4-4-16. LENS CLEANING”.

Note

Before cleaning, be sure to unload the disc from the unit.

Section 6
Replacement of Main Parts

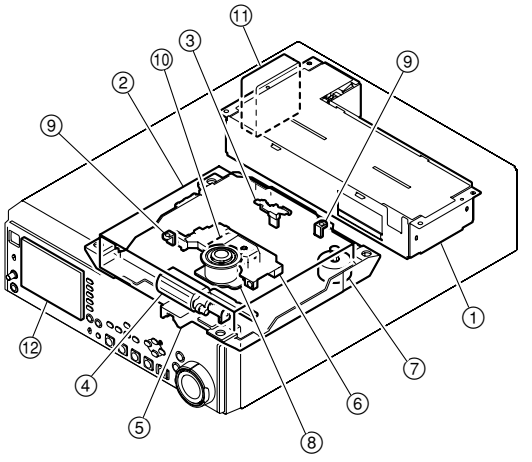
This section explains the replacement procedures of periodic replacement parts, main mechanical parts, power supply unit, and circuit boards.

6-1. General Information for Parts Replacement

6-1-1. Index

This section describes the replacement procedure of the parts below.

(1) Mechanical parts and power supply unit



No.	Part name	Section
①	Power Supply Unit	6-2
②	Loader (P1) Assembly	6-5
③	Cleaner (P1) Assembly	6-6
④	Loading Motor (P1) Assembly	6-7
⑤	Drive (P10) Sub Assembly	6-8
⑥	Optical Block Assembly	6-10
⑦	Seek Motor (P10) Assembly	6-12
⑧	Spindle Motor	6-13
⑨	Cushion	6-14
⑩	Fan Motor (Drive)	6-15-1
⑪	Fan Motor (Side)	6-15-2
⑫	LCD Backlight	6-16

(2) Mounted Circuit Boards

Note

After replacing/repairing the mounted circuit boards (or the assembling parts including them), perform the steps after replacement/repair. (Refer to Section 1-17.)

Board name	Procedure	Steps after replacement
ADC-50	Installation Instructions	—
ADC-50S	Installation Instructions	Section 1-17-6
APR-75/A	Section 6-17-1	—
AU-301/A	Section 6-17-2	—
DPR-270/A	Section 6-17-3	Section 1-17-2
DR-550G	Section 6-17-4	Section 1-17-3
EM-5	Section 6-17-5	—
ENC-101	Section 6-17-6	—
HN-300G	Section 6-17-7	—
HP-130	Section 6-17-8	—
KY-580/A/B	Section 6-17-9	Section 1-17-4
MS-80	Section 6-17-10	—
NET-1	Installation Instructions	—
PS-688	Section 6-2 (Replace by the Power Supply Unit.)	—
RX-93A/B	Section 6-17-11	—
SE-709	Section 6-17-12	—
SE-800	Section 6-17-13	Section 1-17-5
SW-1124G	Section 6-17-14	—
SW-1125G	Section 6-5 (Replace by the Loader (P1) Assembly.)	—
TSI-54	Installation Instructions	—
VP-60/A	Section 6-17-16	—

For the exploded views, refer to the service manual volume 2.

6-1-2. Basic Knowledge

1. Tools

Before using a tool, clean the surface of the tool using a cleaning cloth moistened with cleaning fluid.

- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01

Be careful not to damage the tool. If the flawed tool is used, adjustment cannot be performed correctly.

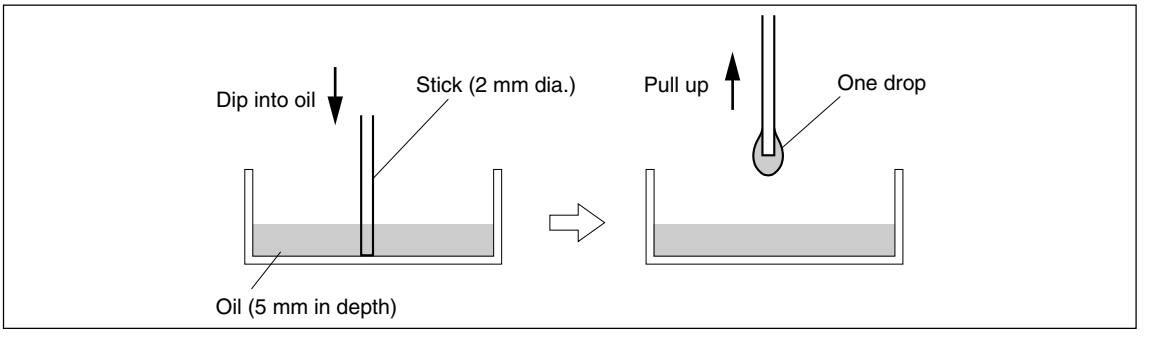
2. Grease and Oil

Use the specified grease and oil at specified portions only.
If any other grease or oil is used, major malfunctions may be caused due to differences in viscosity or ingredients.
And if the grease or oil mixed with dust is used, major malfunctions may be caused.
Use the following grease and oil.

- Grease (SGL-601): 7-661-000-10
- Oil (LX-206): 7-640-010-89

Apply just enough grease to create a thin film on the surface of the part.
Any grease that adheres to other surrounding parts must be removed using gauze or soft cloth.

One drop of oil is defined as follows:
About the amount that will adhere to the end of a stick (2 mm in diameter) as shown in the figure.



Oil

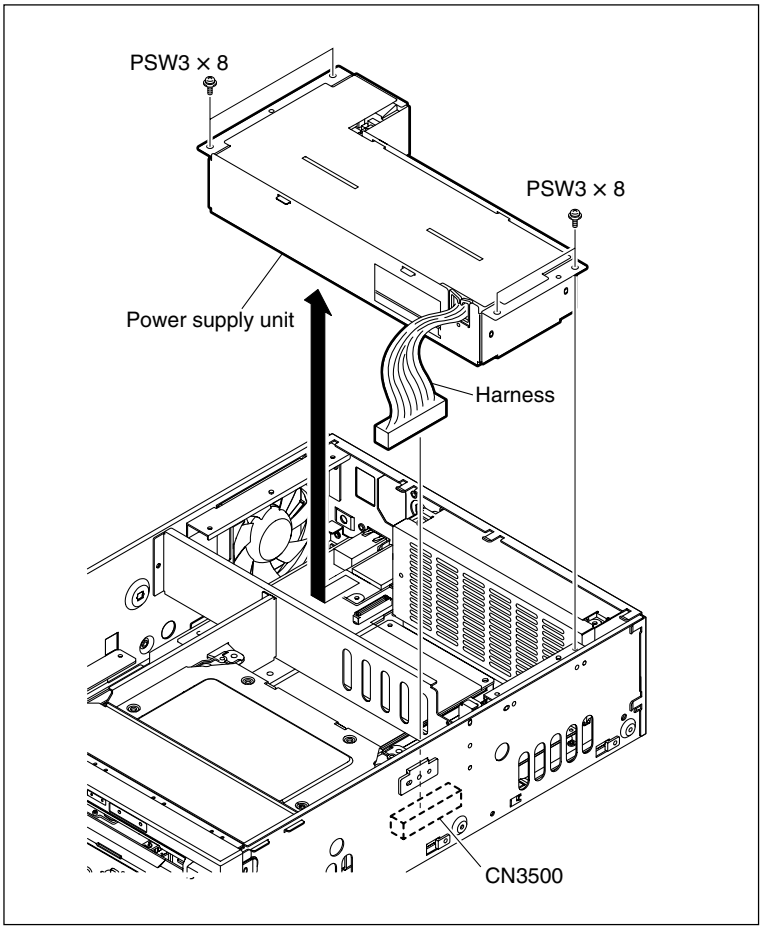
3. Stop Washer and E Ring

Do not use removed stop washers and E rings again.
Check required quantity of stop washers and E rings before replacement, and prepare them more than required quantity.

6-2. Removing/Reattaching Power Supply Unit

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Disconnect the harness from CN3500.
3. Remove the four screws and remove the power supply unit in the arrow direction.



Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 3 of removal.

6-3. Removing/Reattaching Upper Lid Assembly and Shutter Assembly

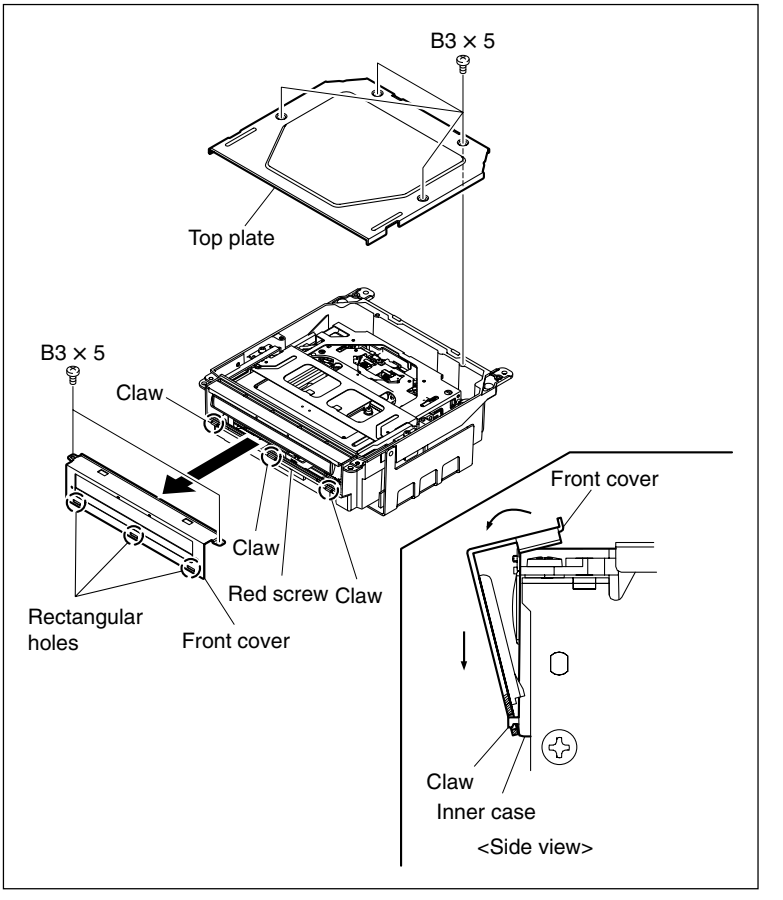
Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the drive unit.
   (Refer to Section 6-17-4.)
3. Remove the two screws, and then remove the front cover in the arrow direction.

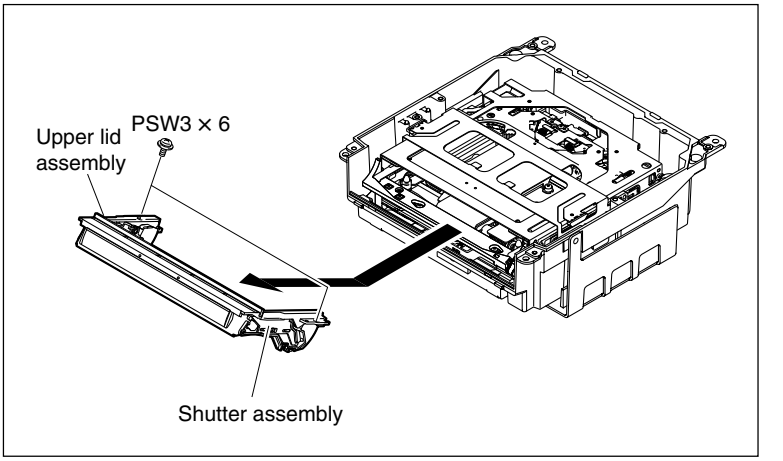
   Notes

   - The front cover cannot be removed easily in any other direction due to the claws on the inner case.
   - Reattach the front cover so that the claws fit into the rectangular holes of the front cover.

4. Remove the four screws to detach the top plate.
5. Confirm the red screw of position shown in figure.
6. Turn clockwise the red screw while pressing it with a Phillips screwdriver (2.2 mm or less) until the shutter assembly is fully raised.

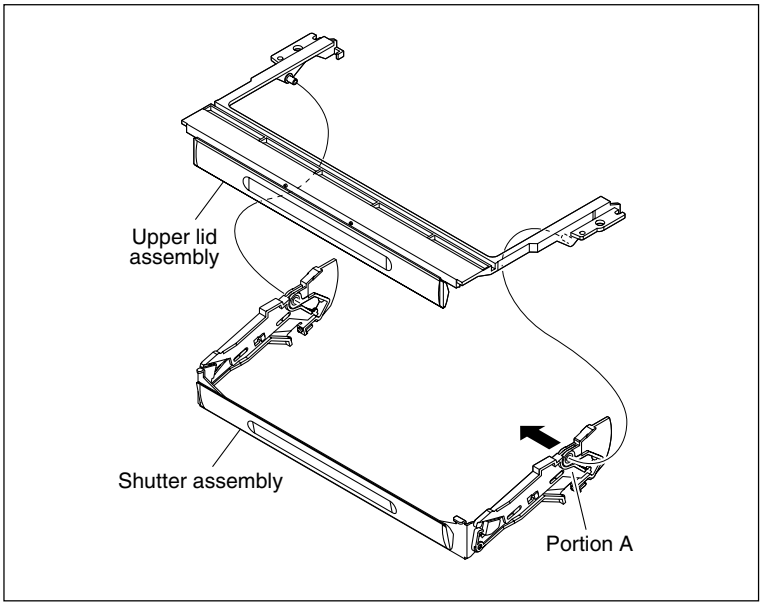


7. Remove the two screws, and then remove the upper lid assembly and shutter assembly in the arrow direction.



Replacement

1. Press portion A gently in the arrow direction, and remove the shutter assembly from the upper lid assembly.

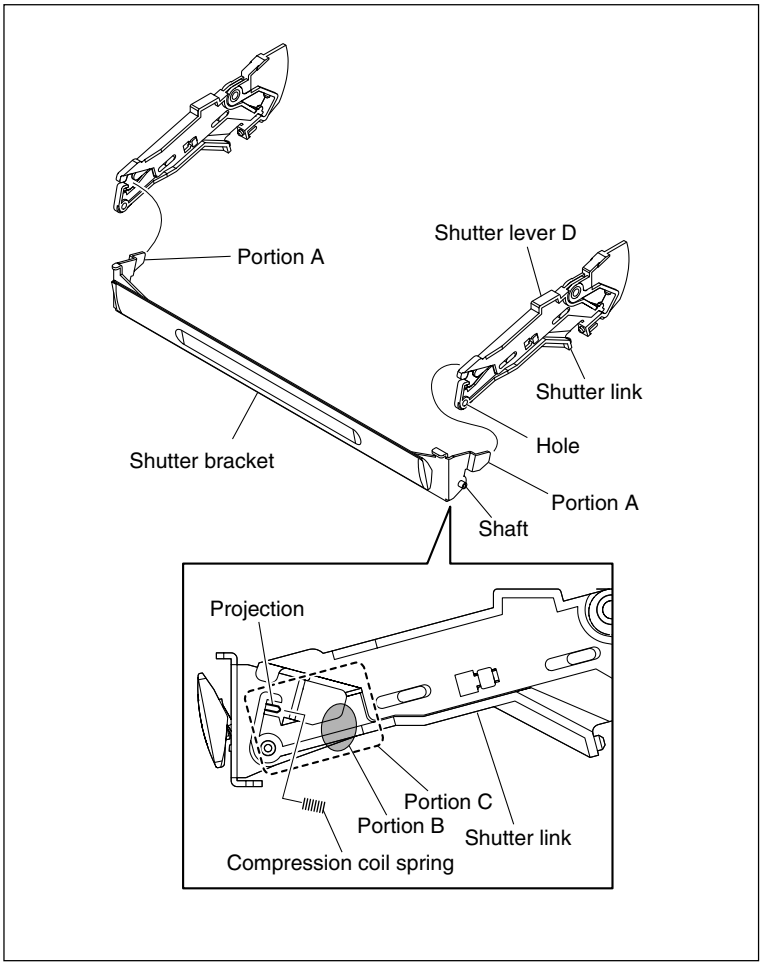


2. Attach a new shutter assembly using the following procedure.
   If it is already assembled, perform step (6) and the following steps.

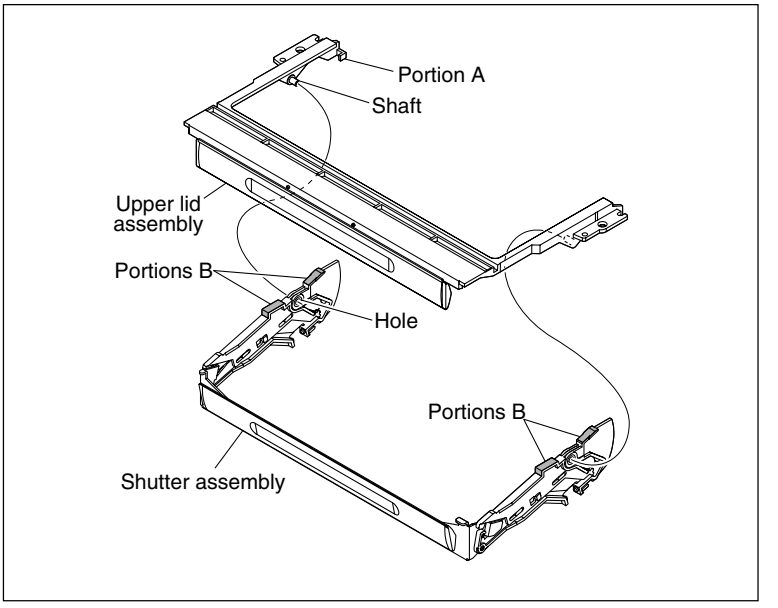
   Note

   Be careful not to lose the compression coil spring, because it easily comes off.

   (1) Hook portion A of the shutter bracket to the shutter lever D and the shutter link.
   (2) Insert the shaft on the shutter bracket into the hole in the shutter link.
   (3) Clamp portion B with a clip.
   (4) Repeat steps (1) to (3) for the other side.
   (5) Install the compression coil springs onto the two projections on the shutter links.
   (6) Clamp portion C with a clip on each side to prevent the compression coil springs from coming off.



3. Hook the edge of the shutter assembly to portion A.
4. Insert the shaft on the upper lid assembly into the hole in the shutter assembly.
5. Repeat steps 3 and 4 for the other side.
6. Apply grease (SGL-601) to four portions B.
7. Remove the two clips.

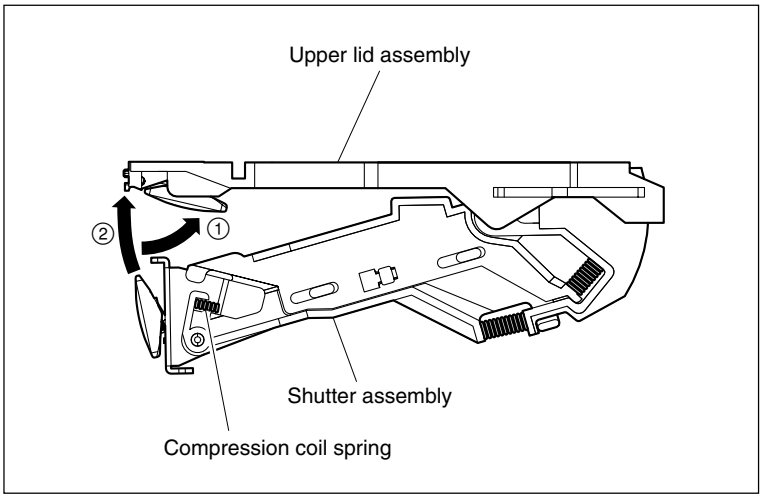


Reattaching

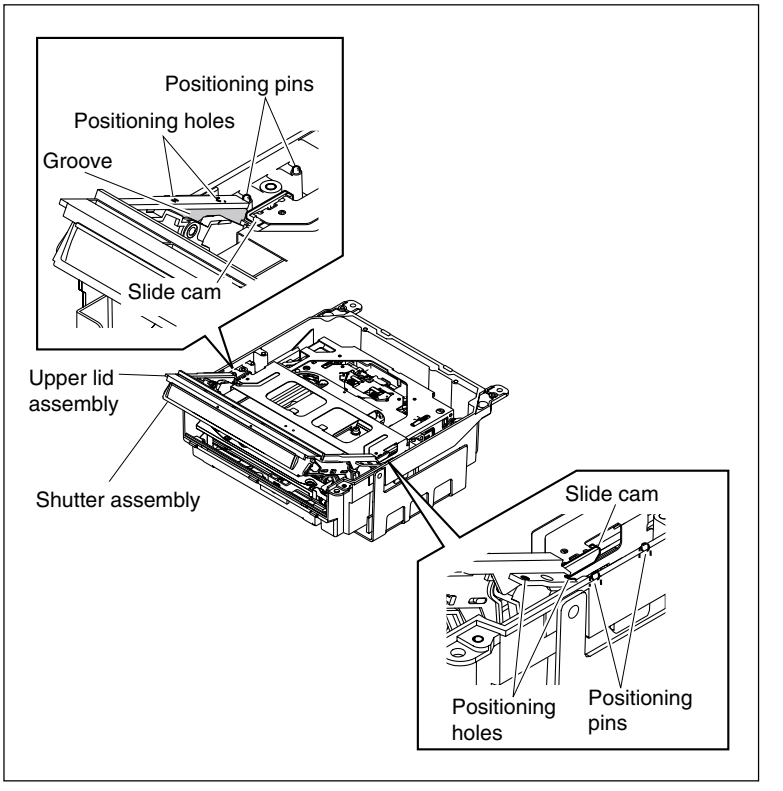
1. Move the lid of the upper lid assembly in the arrow ① direction, and lift the shutter assembly in the arrow ② direction.

   Note

   Be careful not to lose the compression coil spring, because it easily comes off.



2. While keeping the state in step 1, reattach the upper lid assembly and shutter assembly so that the slide cams fit into the right and left grooves.



3. Reattach the removed parts by reversing steps 1 to 4 of removal.

6-4. Replacing Drive (P10) Assembly

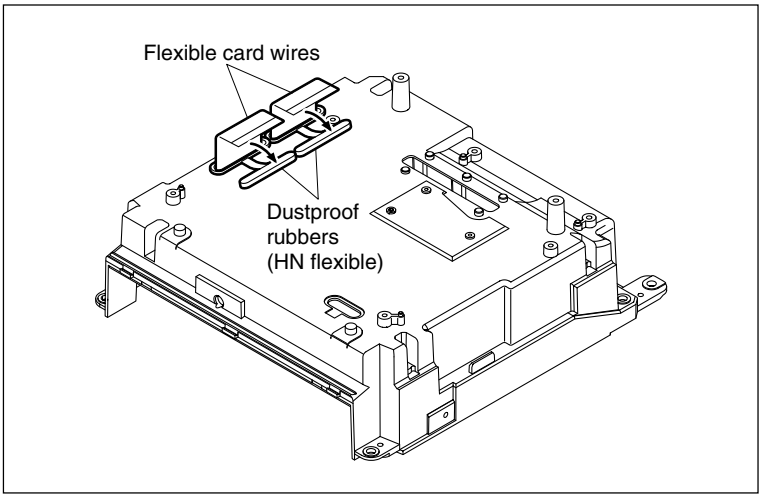
Notes

- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits.
  Keep magentic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged.
  If the magnetic substance is moved close to these parts, their characteristics may be changed.

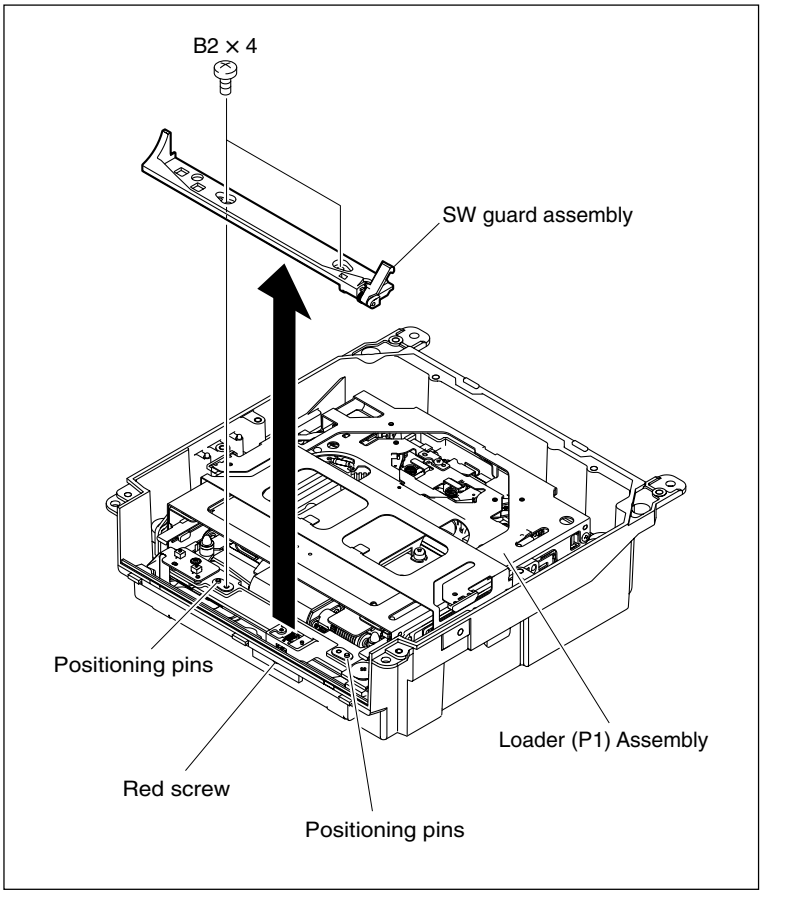
Removal

1. Eject the cartridge.
   Note
   When the cartridge cannot be ejected with the unit powered on, eject the cartridge referring to “1-10. How to Take Out a Cartridge Manually”.

2. Remove the top panel.
   (Refer to Section 1-9-1.)
3. Remove the DR-550G board.
   (Refer to Section 6-17-4.)
4. Open the covers of the two dustproof rubbers (HN) to make the flexible card wires move freely.



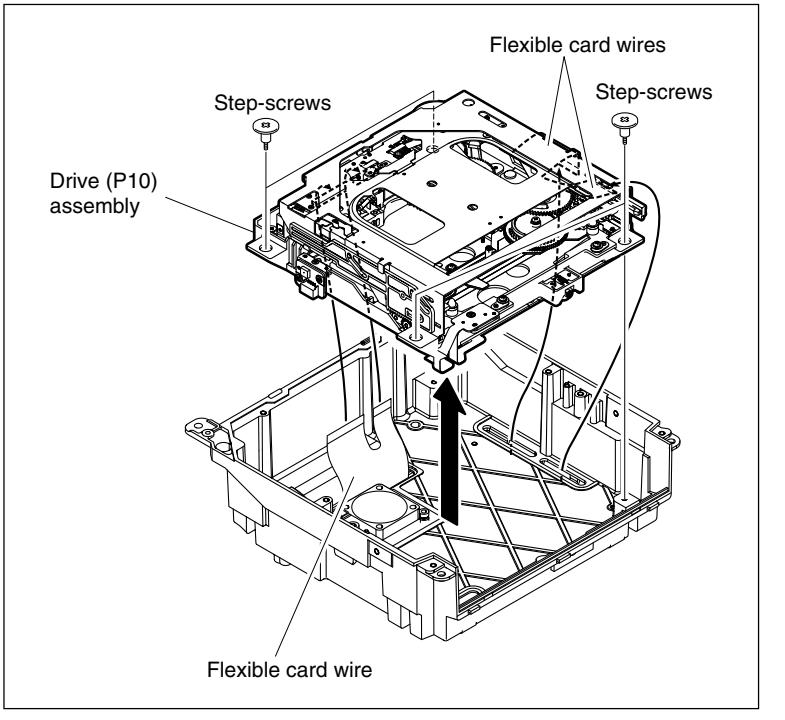
5. Turn down the unit so that the loader (P1) assembly is faced up.
6. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
7. Remove the two screws to remove the SW guard assembly in the arrow direction.
8. Confirm the red screw of position shown in figure.
9. Turn the red screw clockwise while pressing it with a Phillips screwdriver (d = 2.2 mm or less), and shift the loader (P1) assembly approx. 10 mm to the rear side.



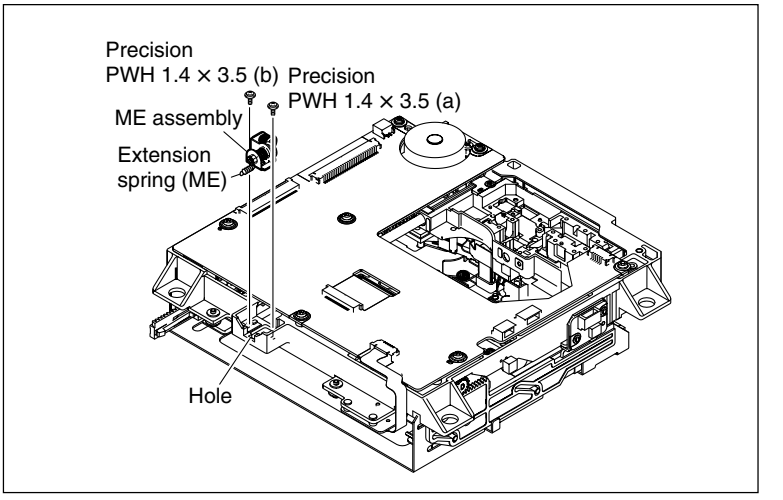
10. Move the optical block assembly outward, unlock the two connectors on the optical block assembly, and disconnect the flexible card wires.
11. Remove the four step-screws, and remove the drive (P10) assembly.

Notes

- When removing the drive (P10) assembly, carefully disconnect the two flexible card wires from the two dustproof rubbers (HN) attached on the inner case.
- Be very careful not to fold the flexible card wire. The life of the flexible card wire will be significantly shortened if it is folded.
- The cover of the dustproof rubber of the flexible card wire connected to the optical block assembly is closed with the projecting length is adjusted. Do not open the cover or pull the flexible card wire.

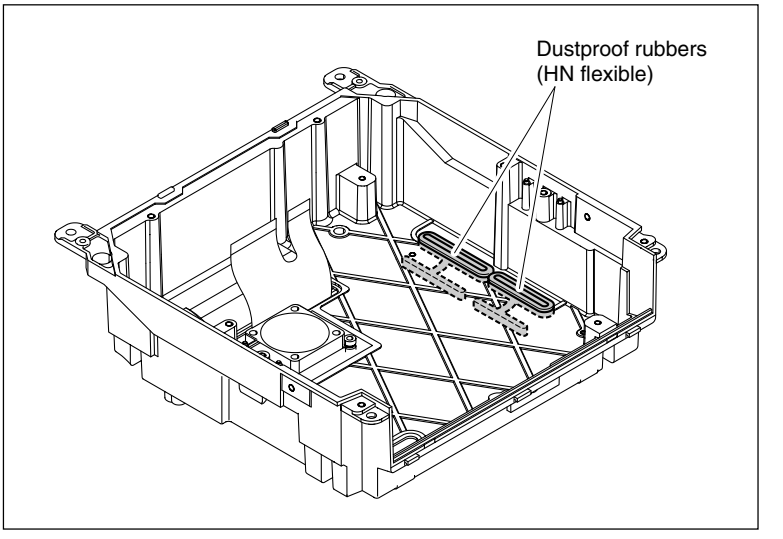


12. Reverse the drive (P10) assembly.
13. Remove the two screws to remove the ME assembly and the extension spring (ME).



Reinstallation

1. Confirm that the two dustproof rubbers (HN) are correctly attached on the inner case.
   Note
   Attach the dustproof rubbers with their covers oriented as shown in the figure.



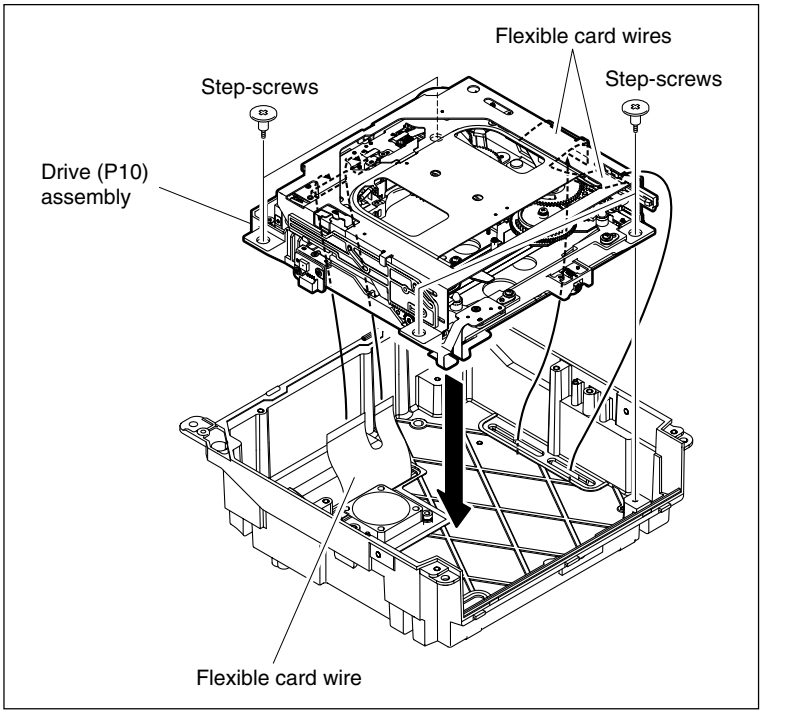
2. Secure the ME assembly temporarily to the new drive (P10) assembly with the screw (a), and tighten the screw (b) to the following torque.
   Tightening torque:
   $10 \times 10^{-2} \pm 0.01$ N•m {1.0 ±0.1 kgf•cm}

3. Tighten the screw (a) to the following torque.
   Tightening torque:
   $10 \times 10^{-2} \pm 0.01$ N•m {1.0 ±0.1 kgf•cm}

4. Hook the extension spring (ME) on the ME assembly and the hole of drive (P10) assembly.

5. Connect the two flexible card wires coming from the DR-550G board and the HN-300G board to a new drive (P10) assembly.
6. Attach the new drive (P10) assembly to the unit.
   When attaching the assembly, insert the two flexible card wires attached to the drive (P10) assembly into the holes of the two dustproof rubbers (HN) on the inner case.
7. Secure the drive (P10) assembly with four step-screws.
   Tightening torque:
   $40 \times 10^{-2} \pm 0.04$ N•m {4 ±0.4 kgf•cm}

8. Reinstall the drive (P10) assembly by reversing steps 1 to 7, and 10 of removal.
   Note
   Before turning down the unit to attach the DR-550G board, firmly close the covers of the two dustproof rubbers that the flexible card wires are putting through.



Adjustment After Replacement

1. Perform “Service Action After Replacing or Repairing the DR-550G Board”.
   (Refer to Section 1-17-3.)

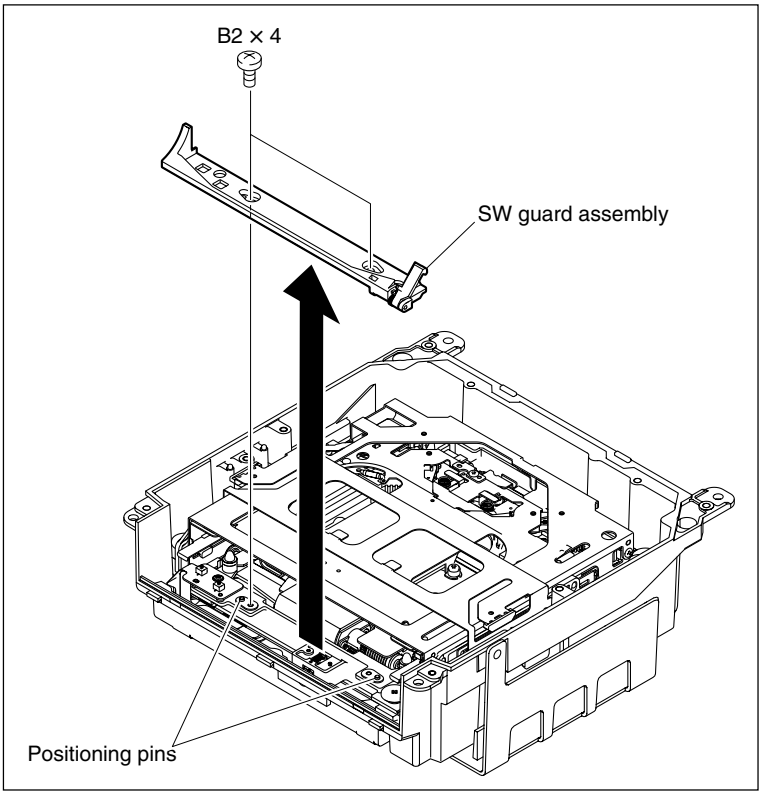
6-5. Replacing Loader (P1) Assembly

Notes

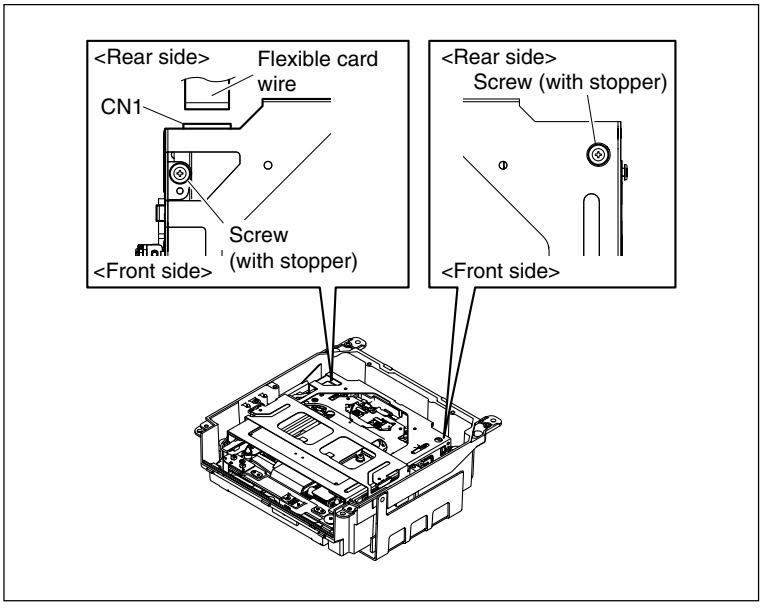
- The loader (P1) assembly requires periodic replacement. Refer to "5-1-3. Periodic Check/Replacement Parts List" for details.
- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If a magnetic substance comes close to these parts, their characteristics may be changed.

Removal

1. Eject the cartridge.
   Note
   When the cartridge cannot be ejected with the unit powered on, eject the cartridge referring to "1-10. How to Take Out a Cartridge Manually".
2. Remove the top panel.
   (Refer to Section 1-9-1.)
3. Remove the drive unit.
   (Refer to Section 6-17-4.)
4. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
5. Remove the two screws to remove the SW guard assembly in the arrow direction.



6. Release the right and left locks of the connector CN1 with tweezers, and disconnect the flexible card wire.
7. Loosen fully the screws with stopper.

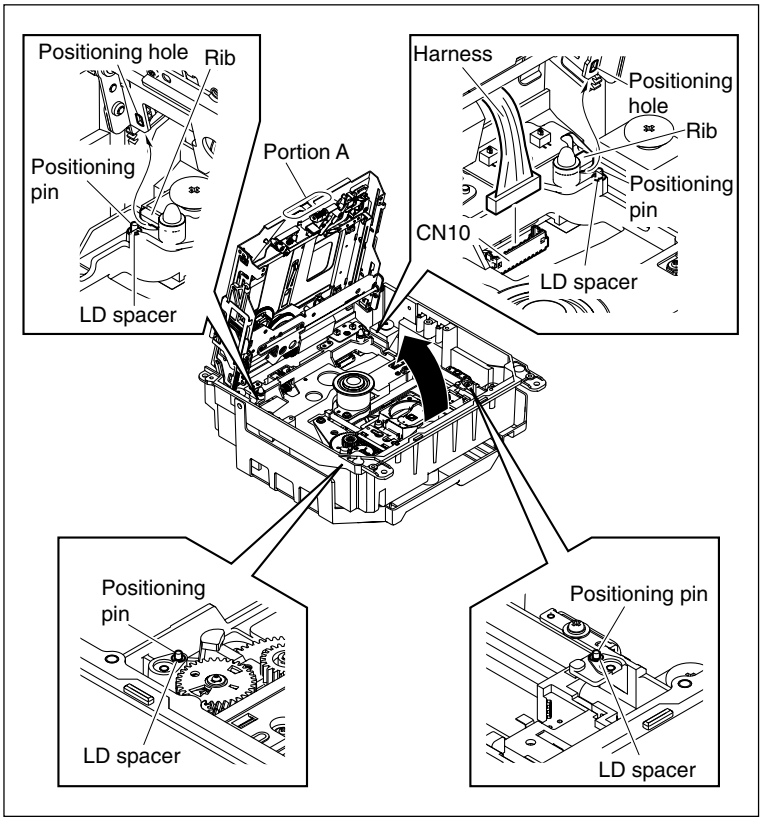


8. Lift portion A of the loader (P1) assembly in the arrow direction.

Notes

- Because the loader (P1) assembly is partially under the two ribs of the front side, slightly slide the loader to the rear side, and then lift it.
- Be careful not to lose the four LD spacers.
- The spindle motor has an intense magnetic circuit. Remove the loader (P1) assembly, being careful not to be attracted by the magnetic force or not to be caught by the edge of the spindle motor.

9. Disconnect the harness from the connector CN10, and then remove the loader (P1) assembly.



Replacing

The slide arm described in step 1 is not a component of the loader (P1) assembly.
The slide arm is used to open and close the shutter of the shutter assembly.
When replacing the loader (P1) assembly, remove the slide arm from the old loader (P1) assembly, and install it to a new loader (P1) assembly.

Note

Improper installation such as wrong installation, missing of parts or deformation will hinder normal operation of the door.

1. Remove the slide arm from the old loader (P1) assembly.
   While lifting portion A of the slide arm in the arrow ① direction, remove the slide arm in the arrow ② direction.

   Notes

   - Do not deform the slide arm.
   - A spacer is attached to the claw A on the slide arm. Be careful not to detach this spacer.

2. Fit the claw A on the slide arm into the hole of the new loader (P1) assembly rack, and hook the claw B to the rack edge.

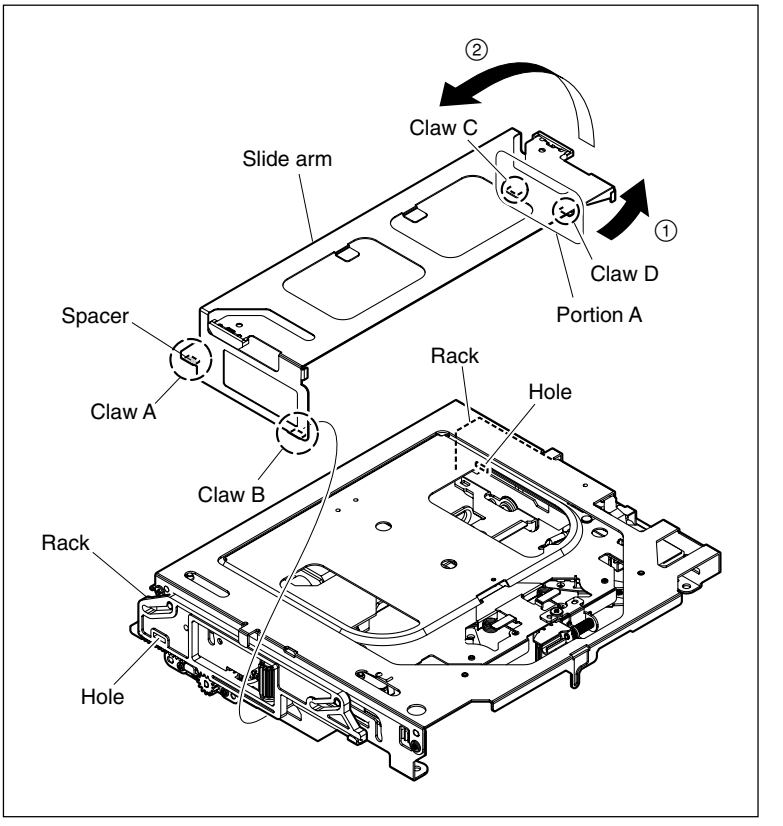
   Note

   A spacer is attached to the claw A on the slide arm. Be careful not to detach this spacer.

3. Fit the claw C into the hole of the opposite rack, and hook the claw D to the rack edge.

   Note

   Do not deform the slide arm.



Reattaching

1. Reattach the removed parts by reversing steps 2 to 9 of removal.

6-6. Replacing Cleaner (P1) Assembly

Notes

- The Cleaner (P1) assembly requires periodic check. Refer to "5-1-3. Periodic Check/Replacement Parts List" for details.
- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits. Keep magnetic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If the magnetic substance is moved close to these parts, their characteristics may be changed.

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the drive unit.
   (Refer to Section 6-17-4.)
3. Remove the top plate. (Refer to Section 6-3.)
4. Confirm that the optical block assembly is located on the IN side (spindle motor side).

   Note

   When the optical block assembly is located on the OUT side (seek motor side), push the sled rack assembly to move it in the IN side.

5. Remove the screw, and remove the cleaner (P1) assembly.

   Note

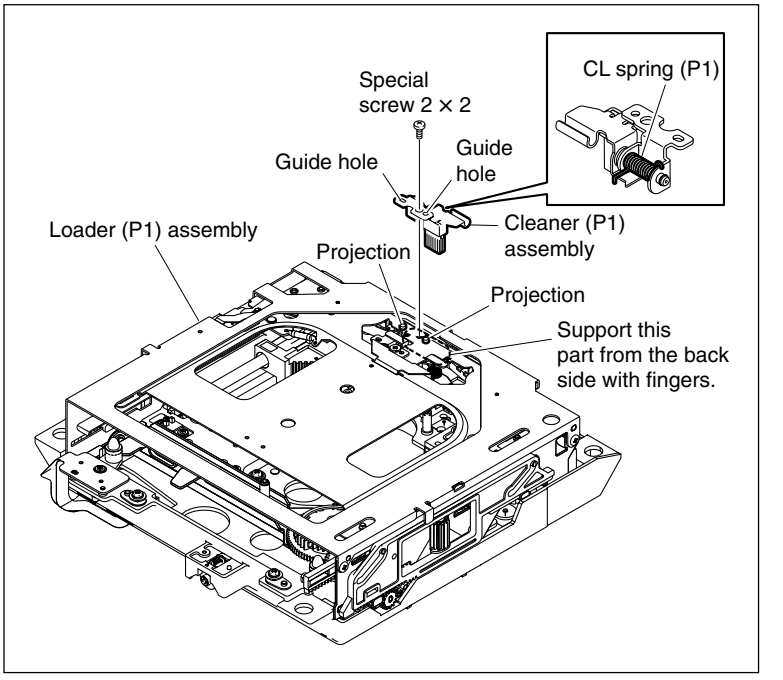
   Be careful not to deform the loader (P1) assembly.

6. Slide the two guide holes in a new cleaner (P1) assembly onto the two projections on the loader (P1) assembly, and secure the cleaner (P1) assembly using one screw.

   Notes

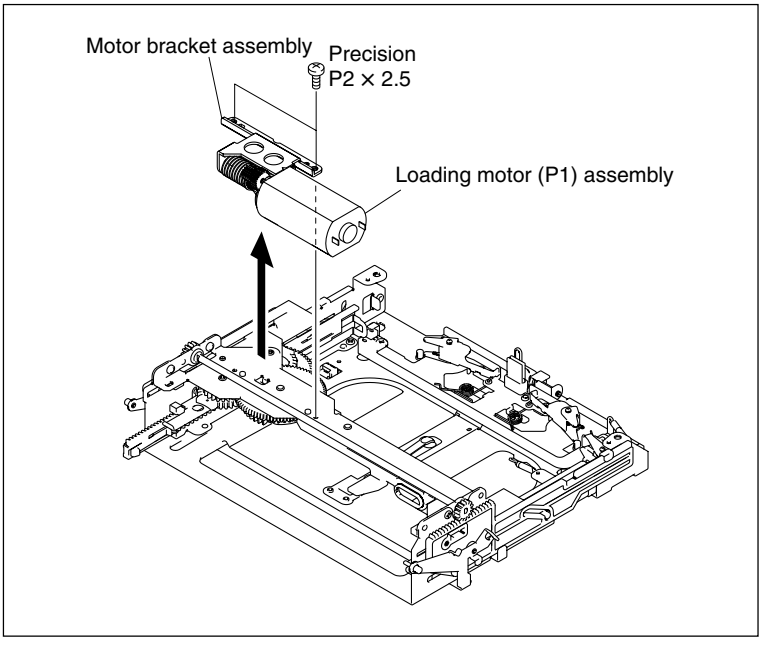
   - When installing, take care so that the CL spring (P1) does not come off.
   - When tightening the screw, support the loader (P1) assembly with fingers not to deform it.

   Tightening torque:
   $20 \times 10^{-2} \pm 0.01$ N•m {2.0 ±0.1 kgf•cm}



6-7. Replacing Loading Motor (P1) Assembly

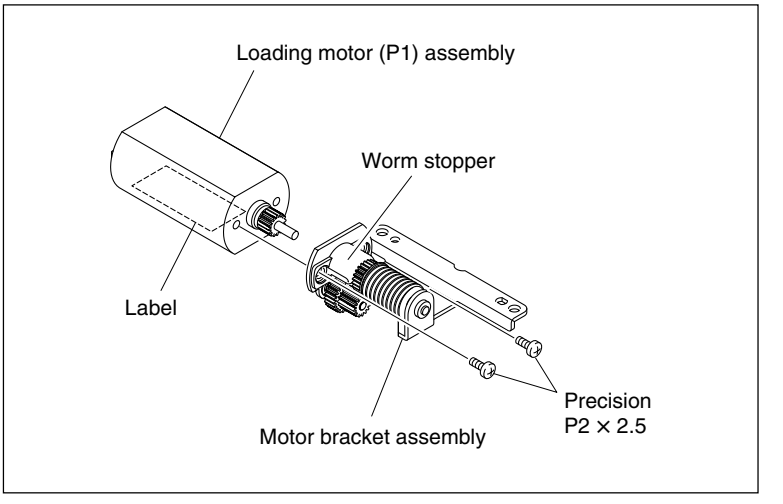
1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
3. Remove the loader (P1) assembly.
   (Refer to Section 6-5.)
4. Remove the SE-709 board.
   (Refer to Section 6-17-13.)
5. Remove the two screws securing the motor bracket assembly from the loader (P1) assembly.



6. Remove the two screws, and remove the loading motor (P1) assembly from the motor bracket assembly.

   Note

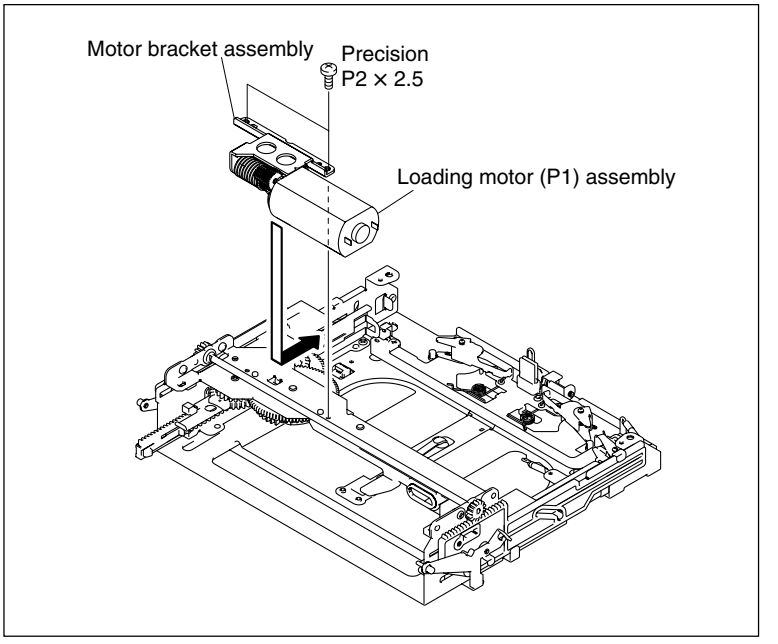
   Be careful for the worm stopper not to come off.



7. Turn the label side down of a new loading motor (P1) assembly and attach it onto the motor bracket assembly as shown in the figure, using two screws.
   Tightening torque:
   $10 \times 10^{-2} \pm 0.01$ N•m {1.0 ± 0.1 kgf•cm}

8. Reattach the motor bracket assembly in the direction of the arrow using two screws. The motor bracket assembly should have no play.

9. Reinstall the removed parts by reversing steps 1 to 4.



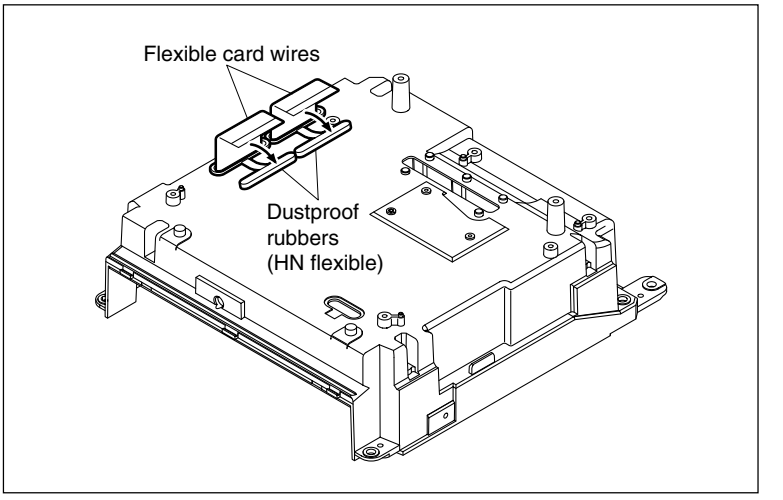
6-8. Removing/Reattaching Drive (P10) Sub Assembly

Notes

- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits.
  Keep magentic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If the magnetic substance is moved close to these parts, their characteristics may be changed.

Removal

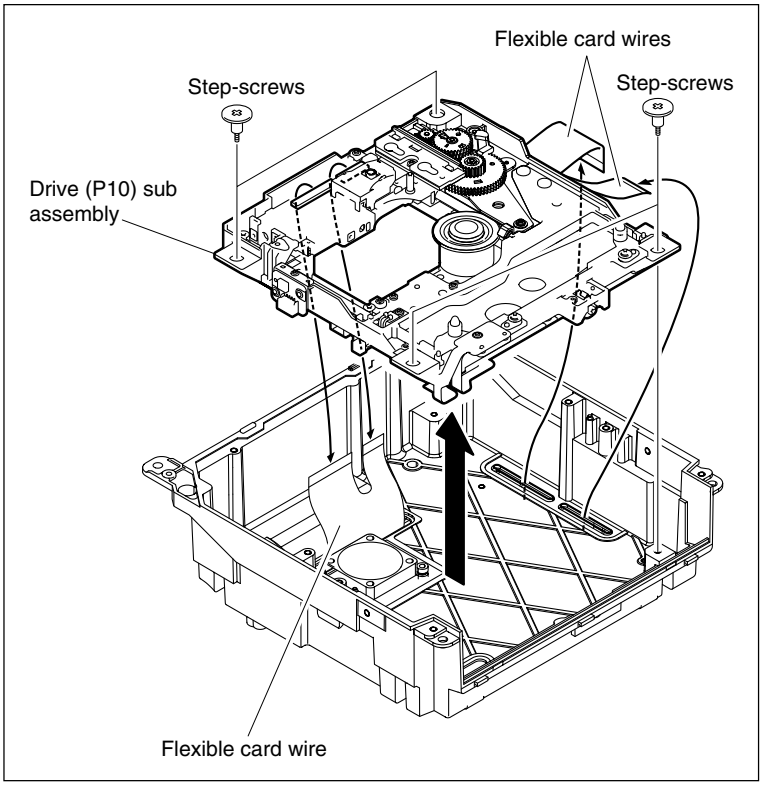
1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the DR-550G board.
   (Refer to Section 6-17-4.)
3. Open the covers of the two dustproof rubbers (HN) to make the flexible card wires move freely.



4. Turn down the unit so that the loader (P1) assembly is faced up.
5. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
6. Remove the loader (P1) assembly. (Refer to Section 6-5.)
7. Unlock the two connectors on the optical block assembly, and disconnect the flexible card wires.
8. Remove the four step-screws, and remove the drive (P10) sub assembly.

Notes

- When removing the drive (P10) sub assembly, carefully disconnect the two flexible card wires from the two dustproof rubbers (HN) attached on the inner case.
- Be very careful not to fold the flexible card wire. The life of the flexible card wire will be significantly shortened if it is folded.
- The cover of the dustproof rubber of the flexible card wire connected to the optical block assembly is closed with the projecting length is adjusted. Do not open the cover or pull the flexible card wire.

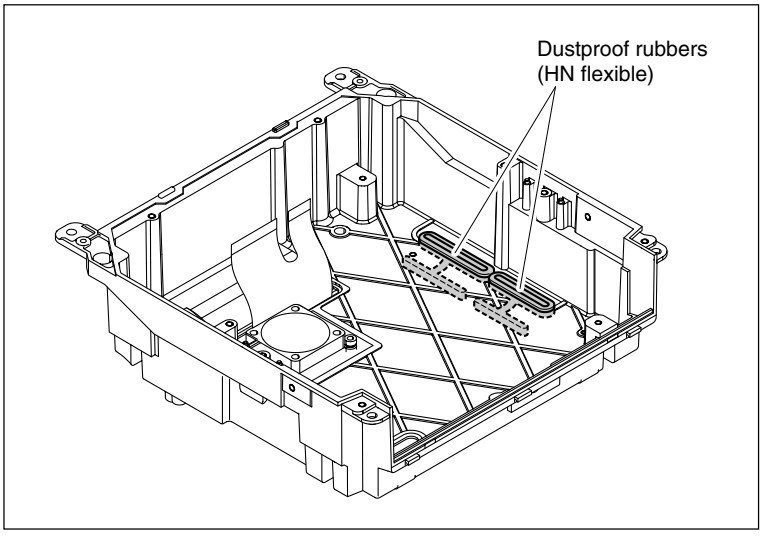


Reinstallation

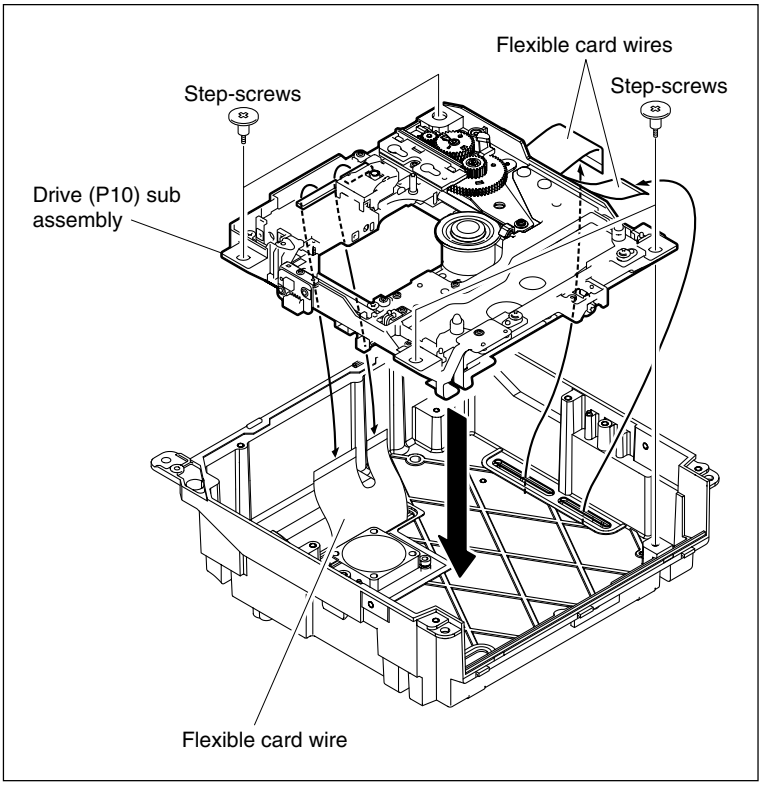
1. Confirm that the two dustproof rubbers (HN) are correctly attached on the inner case.

Note

Attach the dustproof rubbers with their covers oriented as shown in the figure.



2. Attach the drive (P10) sub assembly to the unit.
   When attaching the assembly, insert the two flexible card wires attached to the drive (P10) sub assembly into the holes of the two dustproof rubbers (HN) on the inner case.
3. Secure the drive (P10) sub assembly with four step-screws.
   Tightening torque:
   $40 \times 10^{-2} \pm 0.04$ N•m {4 ±0.4 kgf•cm}



4. Reinstall the removed parts by reversing steps 1 to 7 of removal.

Note

Before turning down the unit to attach the DR-550G board, firmly close the covers of the two dustproof rubbers that the flexible card wires are putting through.

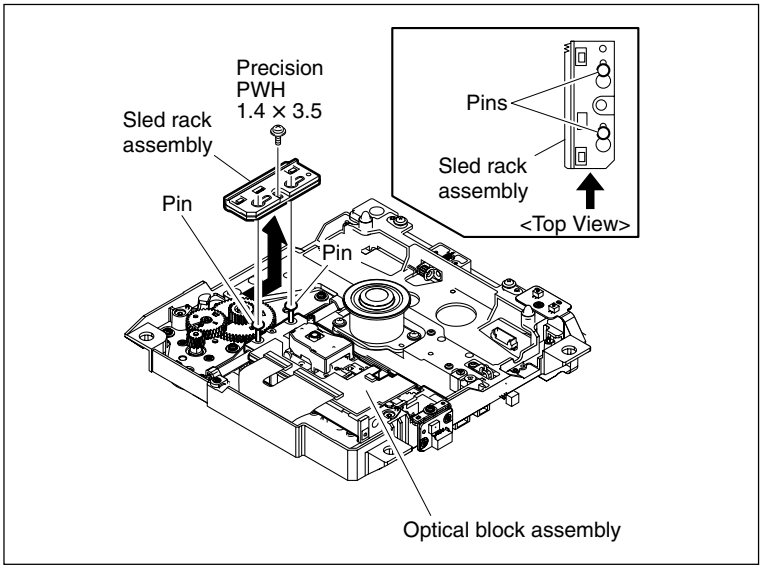
6-9. Removing/Reattaching Sled Rack Assembly

Notes

- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits. Keep magnetic substance away from these parts.
  If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged.
  If the magnetic substance is moved close to these parts, their characteristics may be changed.

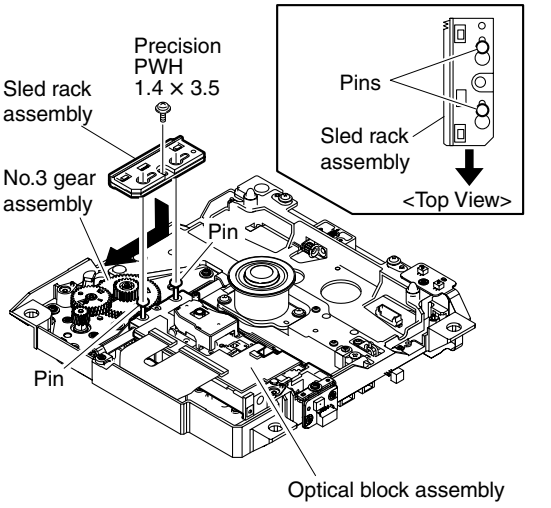
Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
3. Remove the loader (P1) assembly.
   (Refer to Section 6-5.)
4. Move the optical block assembly to the spindle motor side.
5. Remove the screw from the sled rack assembly.
6. Move the sled rack assembly in the direction of the arrow to release it from the two pins of the optical block assembly, and remove it.



Reinstallation

1. Holding the optical block assembly by hand, slide the sled rack assembly onto the two pins of the optical block assembly, and fit the upper and lower gears to engage the sled rack assembly with the No.3 gear assembly in the gear block.
2. Holding the sled rack assembly by hand, move the optical block assembly to align its screw hole to the hole of in the sled rack assembly.
3. Reinstall the sled rack assembly by reversing steps 1 to 5 of removal.



Tightening torque : 10 × 10^{-2} ±0.01N•m {1.0 ±0.1 kgf•cm}

6-10. Replacing Optical Block Assembly

Notes

- The optical block assembly requires periodic replacement. Refer to “5-1-3. Periodic Check/Replacement Parts List” for details.
- To prevent the possibility of damage to the optical block assembly in the drive by static electricity charged in a human body or clothes, be sure to establish a ground before cleaning the drive assembly. (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits. Keep magnetic substance away from these parts. If the magnetic force makes a metallic material such as a screwdriver, reflection block and so on hit the actuator, the objective lens will be damaged. If the magnetic substance is moved close to these parts, their characteristics may be changed.

Fixtures

- Cleaning liquid
- Cleaning cloth
- Oil (LX-206)

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the drive unit.
   (Refer to Section 6-17-4.)
3. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
4. Remove the loader (P1) assembly.
   (Refer to Section 6-5.)
5. Remove the sled rack assembly.
   (Refer to Section 6-9.)
6. Unlock the two connectors on the optical block assembly to disconnect the flexible card wires.

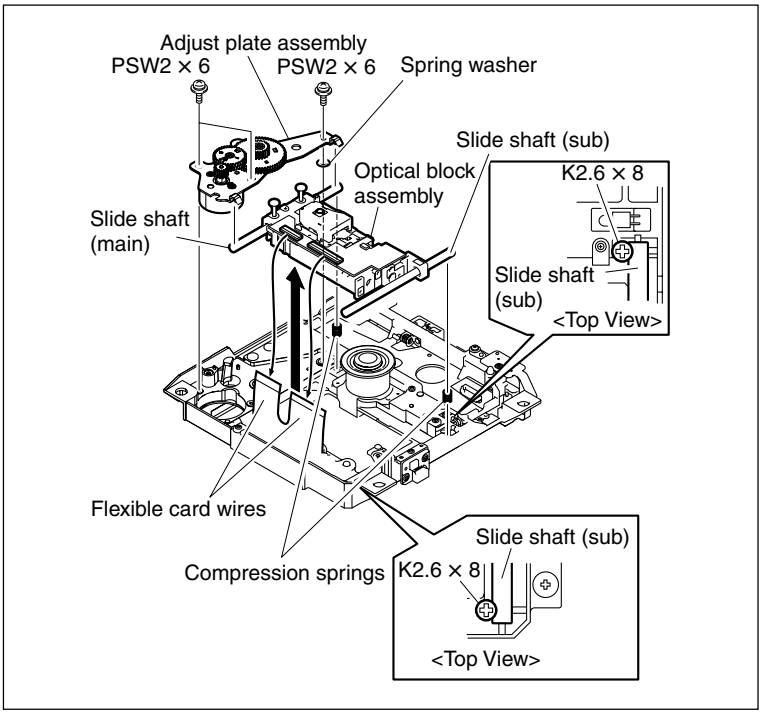
   Note

   Be very careful not to fold the flexible card wire. The life of the flexible card wire will be significantly shortened if it is folded.

7. Remove the three screws (PSW2 × 6) from the adjust plate assembly, and release the retainer of the slide shaft (main) on the optical block assembly.
8. Remove the two screws (K2.6 × 8) from the slide shaft (sub).
9. Remove the optical block assembly together with the slide shaft from the unit.

   Note

   When removing the optical block assembly, confirm that the two compression springs and the spring washer are attached to the positions shown in the figure on the base plate. Be careful not to lose any or drop any in the unit.



Cleaning

1. Clean the drive (P10) sub assembly.
   (Refer to Section 5-2-3.)

Replacement

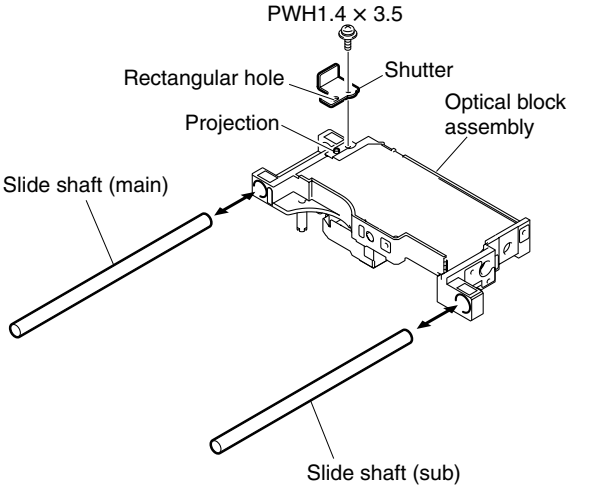
1. Turn down the removed optical block assembly. Remove the screw to remove the shutter shown in the figure.
2. Attach the shutter removed in step 1 to a new optical block assembly using one screw.

   Notes

   - Attach the shutter to the new optical block assembly without unpacking the assembly from the packing material, following the installation guide supplied with the assembly.
   - Slide the projection of the optical block assembly into the rectangular hole of the shutter.

   Tightening torque:
   $10 \times 10^{-2} \pm 0.01$ N•m {1.0 ±0.1 kgf•cm}

3. Remove the two slide shafts from the removed optical block assembly, and clean them using the cleaning cloth with the cleaning liquid soaked.
4. Put the two slide shafts through the new optical block assembly.



Tightening torque : $10 \times 10^{-2} \pm 0.01$N•m {1.0 ±0.1 kgf•cm}

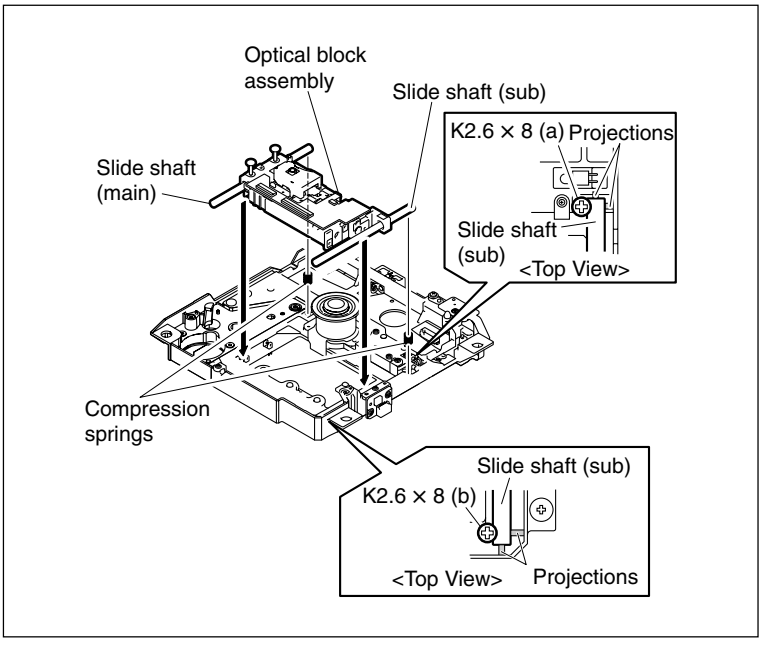
Reinstallation

1. Attach the optical block assembly on the base plate, being careful about the following:
   - Place the slide shaft (main) and the slide shaft (sub) onto the two compression springs.
   - Align the edges of the shaft (sub) with the two projections of the base plate shown in the figure.
   - Press the slide shaft (main) and the slide shaft (sub) in the direction shown in the figure.
2. Tighten the screws (a), (b) (K2.6 × 8) until just before the following tightening torque is applied, and then loosen the screw (a) 3/4 turns.
   Tightening torque:
   $30 \times 10^{-2} \pm 0.03$ N•m {3 ±0.3 kgf•cm}

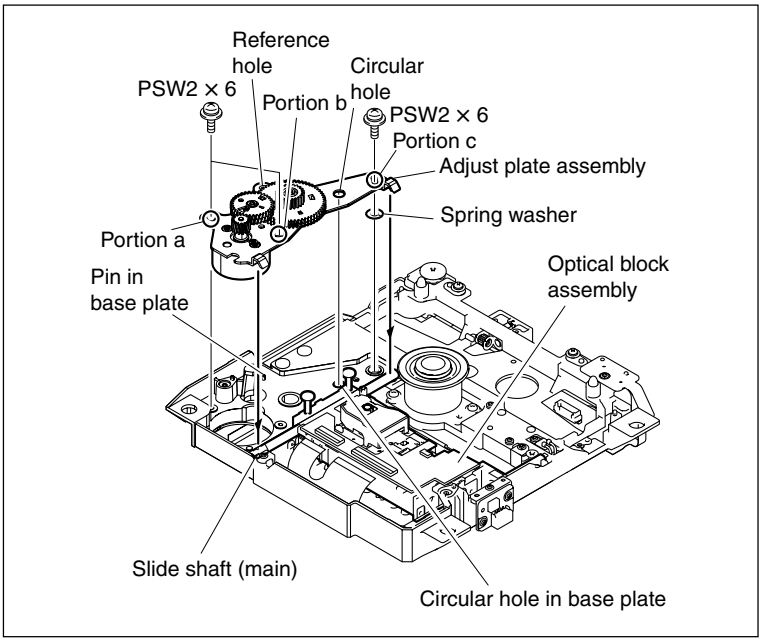
   Note

   "Just before the torque is applied" means the state in which the compression springs are compressed.

3. Tighten further the screw (b) (K2.6 × 8) with the following specified torque.
   Tightening torque:
   $30 \times 10^{-2} \pm 0.03$ N•m {3 ±0.3 kgf•cm}



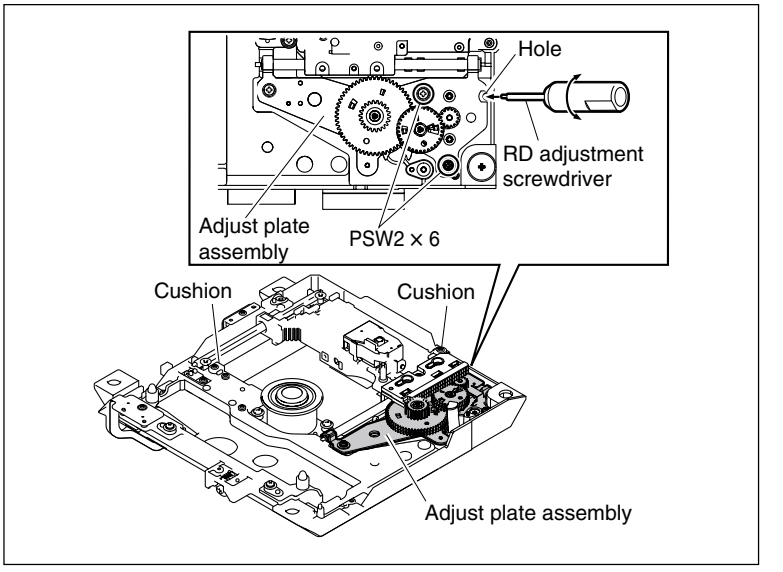
4. Place the adjust plate assembly onto the slide shaft (main).
5. Fit the reference hole of the adjust plate assembly to the pin on the base plate, and adjust the position of the plate assembly so that its circular hole fits the circular hole of the base plate.
6. Secure the adjust plate assembly by tightening two screws (PSW2 × 6) through the portion a and b of the assembly until the spring washer is compressed a little.
7. Tighten a screw (PSW2 × 6) through the portion c until just before the following tightening torque is applied, and then loosen it one and a half turns.
   Tightening torque:
   $1 \times 10^{-2} \pm 0.001$ N•m {100 ±10 gf•cm}



8. Install the sled rack assembly.
   (Refer to Section 6-9.)
9. Slide the sled rack assembly with fingers and check the following.
   Do not hold any part other than the sled rack.
   - The sled rack assembly moves smoothly until it reaches the cushion.
   - The gears turn smoothly.

   Note

   If the assembly does not move smoothly, adjust the position of the adjust plate assembly using an RD adjustment screwdriver.

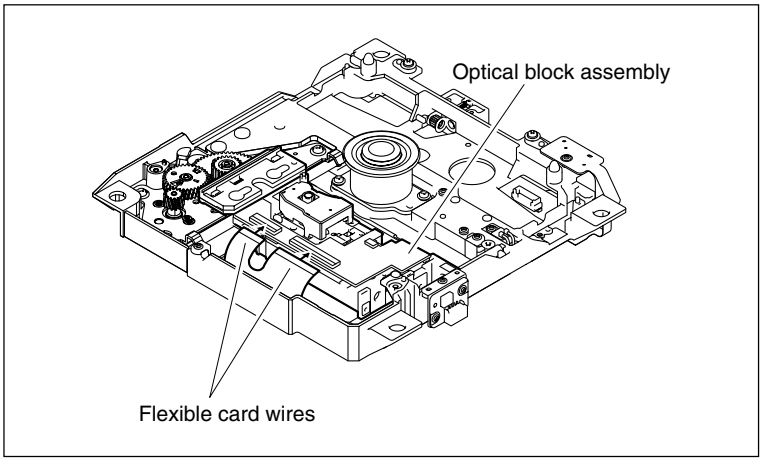


10. Insert fully the flexible card wires to the two connectors on the optical block assembly, and securely lock them.

    Notes

    - If the connections are not sufficient, the unit will not function correctly.
    - Be careful not to overstress the optical block assembly.

11. Install the drive unit.
    (Refer to Steps 2, 3 in Section 6-17-4.)
12. Perform “Adjustments After Replacing Optical Block Assembly”.
    (Refer to Section 7-1-3.)



6-11. Replacing No.2/No.3 Gear Assemblies

Notes

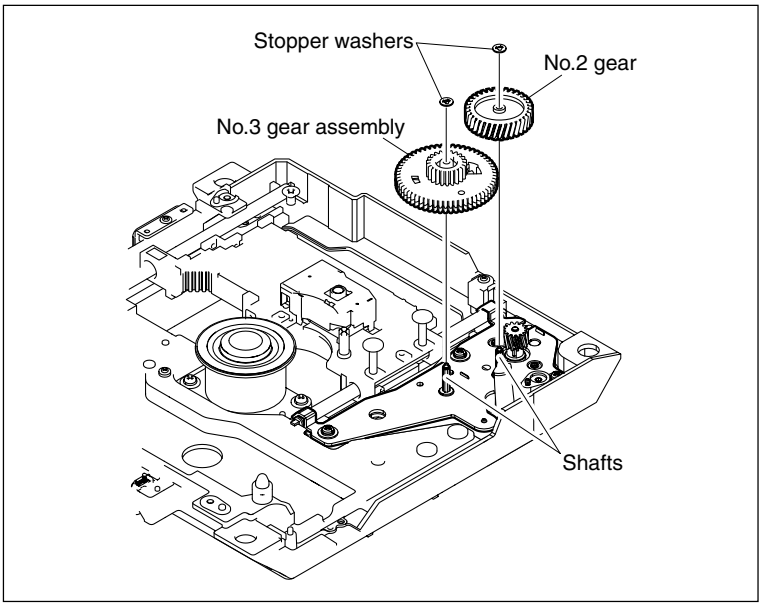
- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits. Keep magnetic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If the magnetic substance is moved close to these parts, their characteristics may be changed.

Fixtures

Parallel pin (2 × 20) : 1

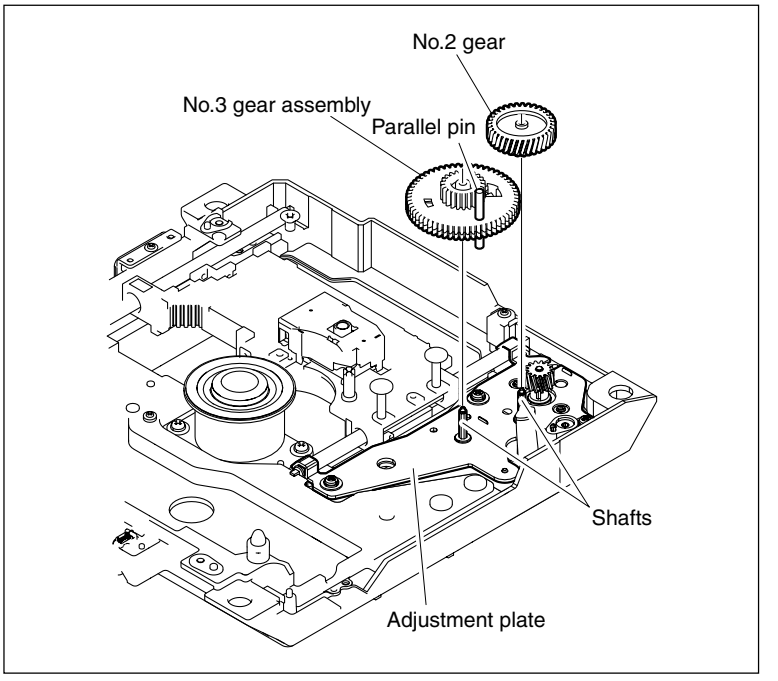
Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the drive unit.
   (Refer to Section 6-17-4.)
3. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
4. Remove the loader (P1) assembly.
   (Refer to Section 6-5.)
5. Remove the sled rack assembly.
   (Refer to Section 6-9.)
6. Remove the stopper washer, and remove the No.2 gear.
7. Remove the stopper washer, and remove the No.3 gear assembly.

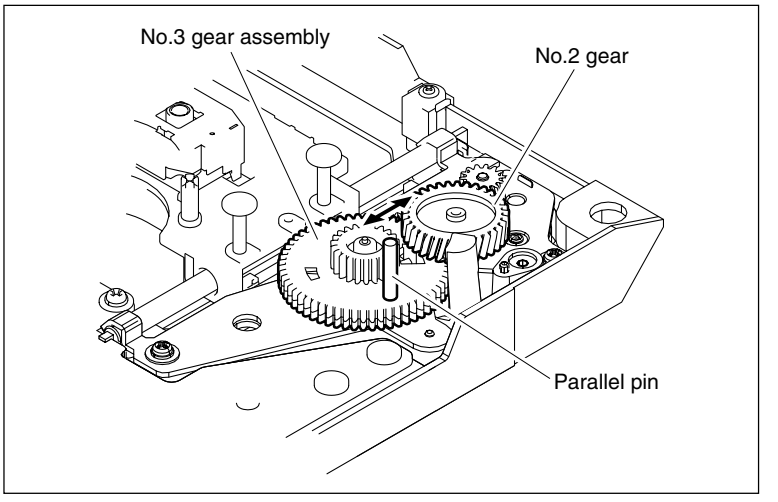


Phase Adjustment of Gears

1. Put the parallel pin through the holes in the two gears of a new No.3 gear assembly.
2. Attach the No.3 gear assembly to the shaft on the adjustment plate.

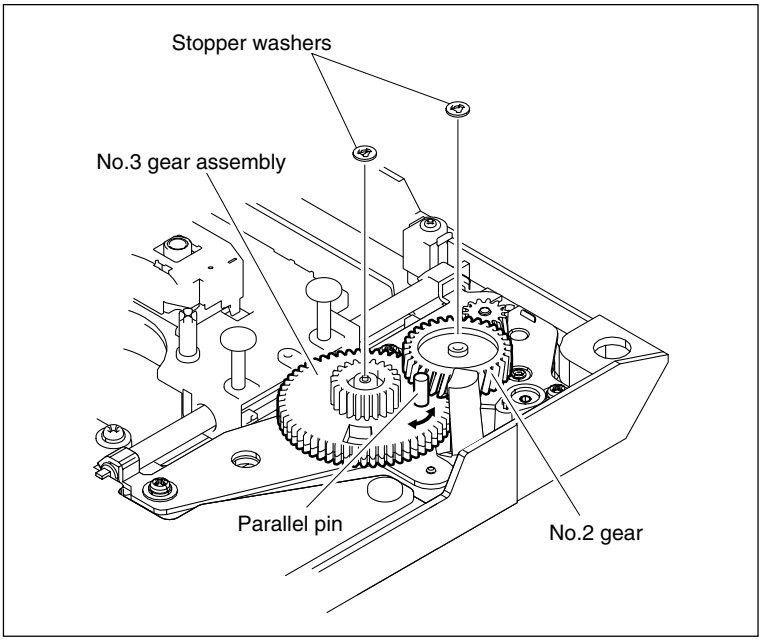


3. If the gears are not smoothly engaged, move the parallel pin putting through the No.3 gear assembly in the direction of the arrow. This engages the No.2 gear with the No.3 gear assembly.



4. Reattach the two stopper washers to the shafts of the No.2 gear and No.3 gear assembly.

5. Remove the parallel pin.



Reinstallation

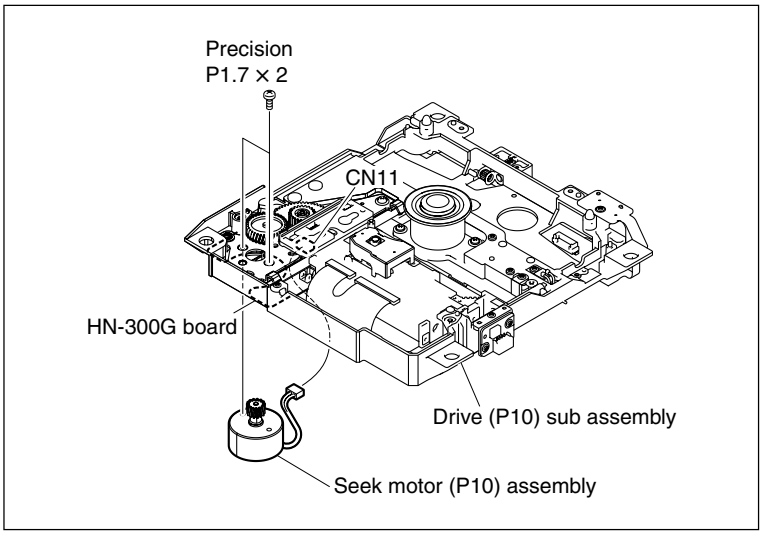
1. Reinstall the removed parts by reversing steps 1 to 4 of removal.

6-12. Replacing Seek Motor (P10) Assembly

Notes

- The seek motor (P10) assembly requires periodic replacement. Refer to "5-1-3. Periodic Check/Replacement Parts List" for details.
- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If the magnetic substance is moved close to these parts, their characteristics may be changed.

1. Remove the top panel. (Refer to Section 1-9-1.)
2. Remove the DR-550G board. (Refer to Section 6-17-4.)
3. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
4. Remove the loader (P1) assembly. (Refer to Section 6-5.)
5. Remove the drive (P10) sub assembly. (Refer to Section 6-8.)
6. Disconnect the harness from the connector CN11 on the HN-300G board.
7. Remove the two screws, and remove the seek motor (P10) assembly.



8. Attach a new seek motor (P10) assembly onto the adjustment plate using two screws so as to align the two holes with the shafts of the adjustment plate.
9. Reinstall the removed parts by reversing steps 1 to 6.

6-13. Replacing Spindle Motor

Notes

- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If the magnetic substance is moved close to these parts, their characteristics may be changed.

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the DR-550G board.
   (Refer to Section 6-17-4.)
3. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
4. Remove the loader (P1) assembly.
   (Refer to Section 6-5.)
5. Remove the drive (P10) sub assembly.
   (Refer to Section 6-8.)

6. Unlock the connector CN4 on the HN-300G board, and disconnect the flexible card wire.

Note

Be very careful not to fold the flexible card wire. The life of the flexible card wire will be significantly shortened if it is folded.

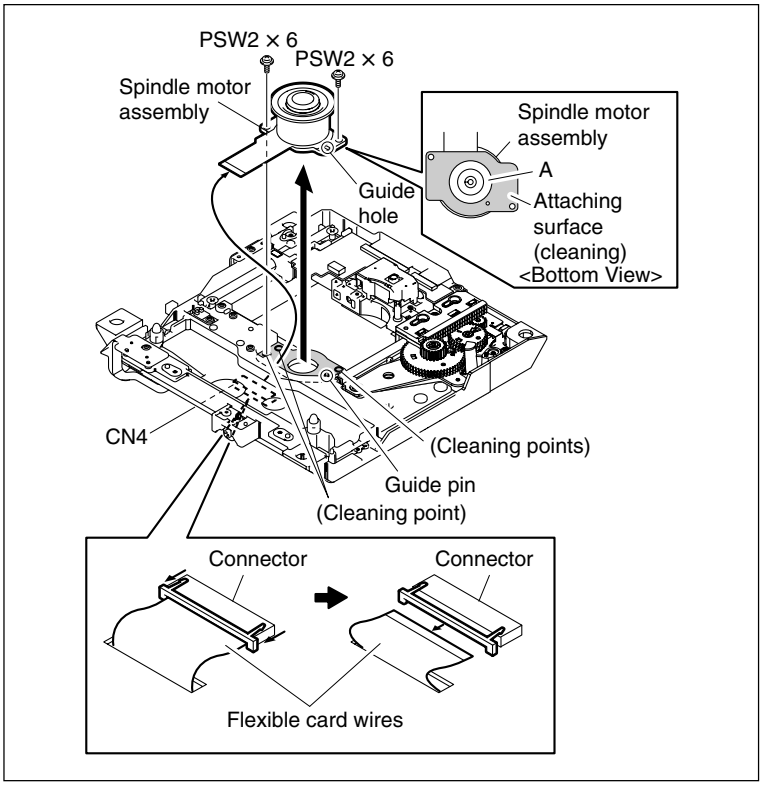
7. Remove the two screws, and remove the spindle motor assembly.
8. Clean the attaching surfaces of a new spindle motor and of the base plate using a cleaning cloth with cleaning liquid soaked.
9. Put the flexible card wire of the spindle motor through the obround hole of the base plate.

Note

Be very careful not to fold the flexible card wire. The life of the flexible card wire will be significantly shortened if it is folded.

10. Slide the guide pin of the base plate into the hole in the spindle motor, and slide the portion A of the spindle motor into the center hole in the base plate.
11. Secure the spindle motor with two screws.
    Tightening torque:
    $20 \times 10^{-2} \pm 0.01$ N•m {2.0 ±0.1 kgf•cm}

12. Reinstall the removed parts by reversing steps 1 to 6.



Adjustment After Replacement

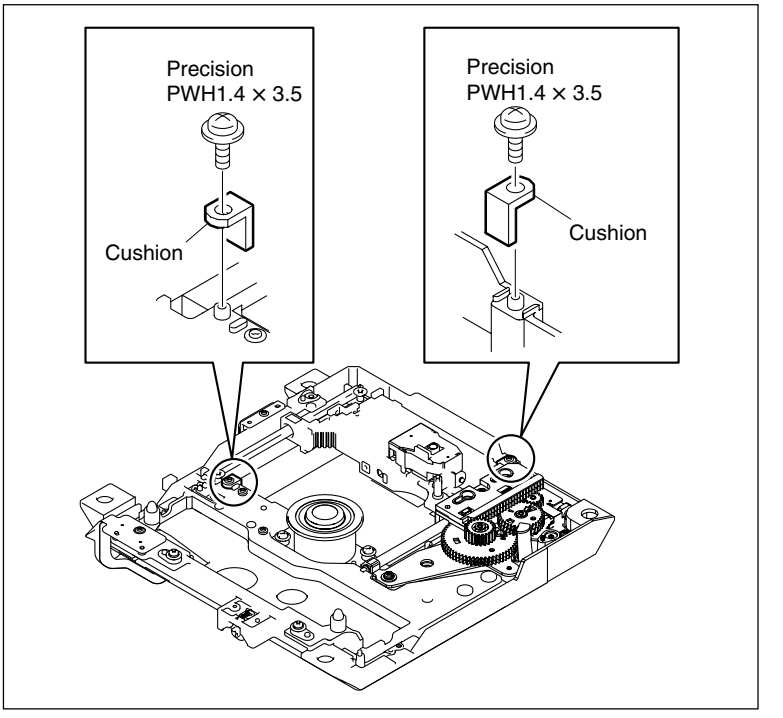
1. After replacing the spindle motor, check the skew to check whether the specification is satisfied. (Refer to Section 7-1-4.)
   If not, adjust the skew.
   (Refer to Section 7-1-4.)
2. Check the RD to check whether the specification is satisfied. (Refer to Section 7-1-5.)
   If not, adjust the RD.
   (Refer to Section 7-1-5.)

6-14. Replacing Cushion

Notes

- The Cushions require periodic check. Refer to "5-1-3. Periodic Check/Replacement Parts List" for details.
- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits. Keep magnetic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If the magnetic substance is moved close to these parts, their characteristics may be changed.

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
3. Remove the loader (P1) assembly.
   (Refer to Section 6-5.)
4. Remove the screw, and remove the cushion.

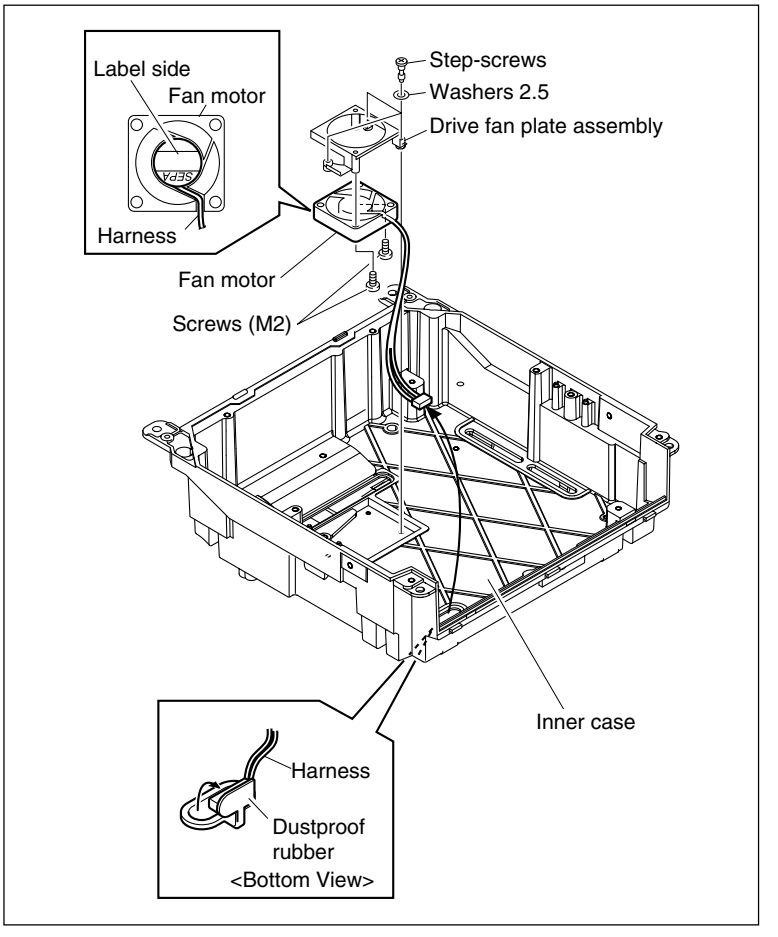


5. Attach a new cushion with the screw.
6. Reinstall the removed parts by reversing steps 1 to 3.

6-15. Replacing Fan Motor

6-15-1. Replacing Fan Motor (Drive)

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the DR-550G board.
   (Refer to Section 6-17-4.)
3. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
4. Remove the loader (P1) assembly.
   (Refer to Section 6-5.)
5. Remove the drive (P10) sub assembly.
   (Refer to Section 6-8.)
6. Remove the harness of the fan motor from the dustproof rubber attached on the inner case.
7. Remove the three step-screws, and remove the drive fan plate assembly from the inner case.
8. Remove the two screws, and remove the fan motor from the drive fan plate assembly.



9. Attach a new fan motor with its label side up oriented as shown in the figure onto the drive fan plate assembly, and secure it with two screws.
   Tightening torque:
   $19 \times 10^{-2} \pm 0.03$ N•m {1.9 ±0.3 kgf•cm}

10. Attach the drive fan plate assembly with the fan motor attached to the inner case, and secure them with three step-screws.
    Tightening torque:
    $19 \times 10^{-2} \pm 0.03$ N•m {1.9 ±0.3 kgf•cm}

11. Reinstall the removed parts by reversing steps 1 to 6.

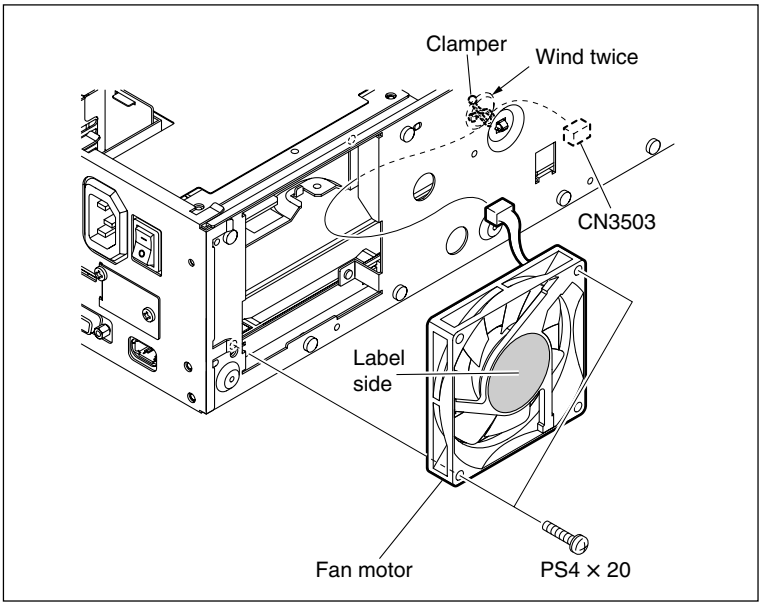
6-15-2. Replacing Fan Motor (Side)

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the power supply unit.
   (Refer to Section 6-2.)
3. Release the clamper and disconnect the harness from CN3503.

   Notes

   When connecting, take care the following.
   - Wind the harness around the clamper twice.
   - Bend the harness from connector CN3503 to clamper, not bend it from clamper to fan motor.

4. Remove the two screws to detach the fan motor.



5. Attach a new fan motor as shown in the figure, and secure it with the two screws.

   Tightening torque:

   140×10^{-2} N•m {14.0 kgf•cm}

   Note

   Be careful of the label side and the harness direction.

6. Reinstall the removed parts by reversing steps 1 to 3 above.

6-16. Replacing LCD Backlight

1. Remove the front panel assembly.
   (Refer to Section 1-9-2.)
2. Remove the KY-580/A/B board.
   (Refer to Section 6-17-9.)
3. Disconnect the flexible card wires from CN500 and CN1200.

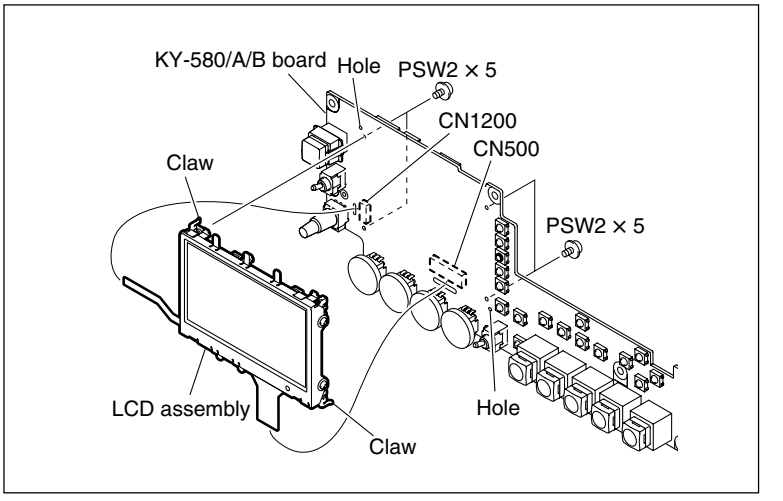
   Note

   Be very careful not to fold the flexible card wire. The life of the flexible card wire will be significantly shortened if it is folded.

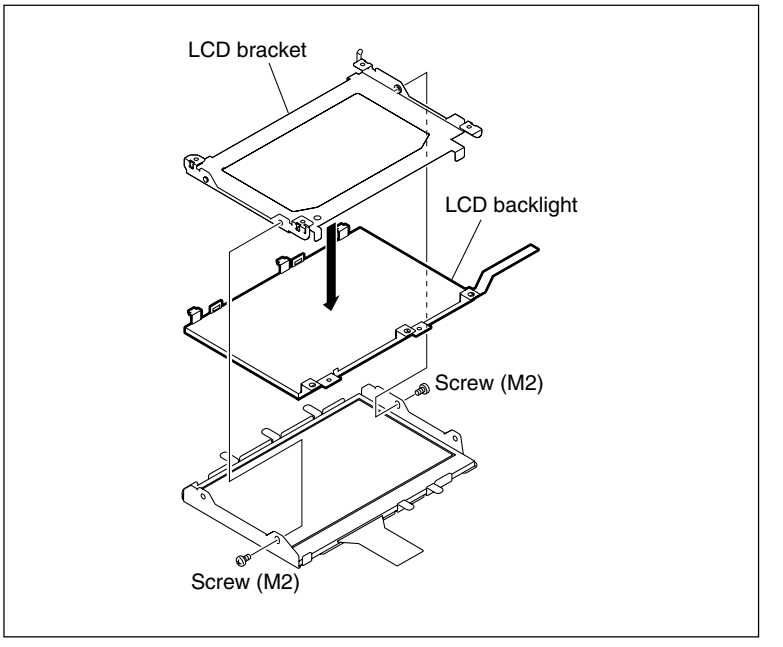
4. Remove the four screws to detach the LCD assembly.

   Note

   When reattaching the LCD assembly, fit its two claws into the holes.



5. Remove the two screws to detach the LCD backlight from the LCD bracket.



6. Reinstall a new LCD backlight and the removed parts by reversing steps 1 to 5 above.

6-17. Removing/Reattaching Mounted Circuit Boards

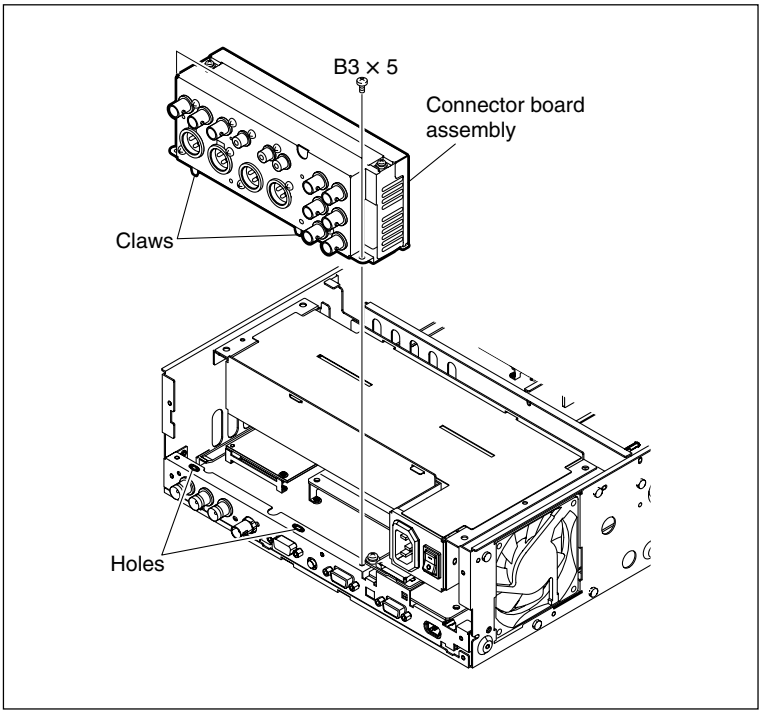
6-17-1. APR-75/A Board

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the connector panel.
   (Refer to Section 1-9-3.)
3. Remove the two screws and remove the connector board assembly.

   Note

   Be careful of the following when reinstalling the connector board assembly.
   - Fit the two claws on the connector board assembly into the holes of the DPR bracket.
   - Connect the five connectors firmly.

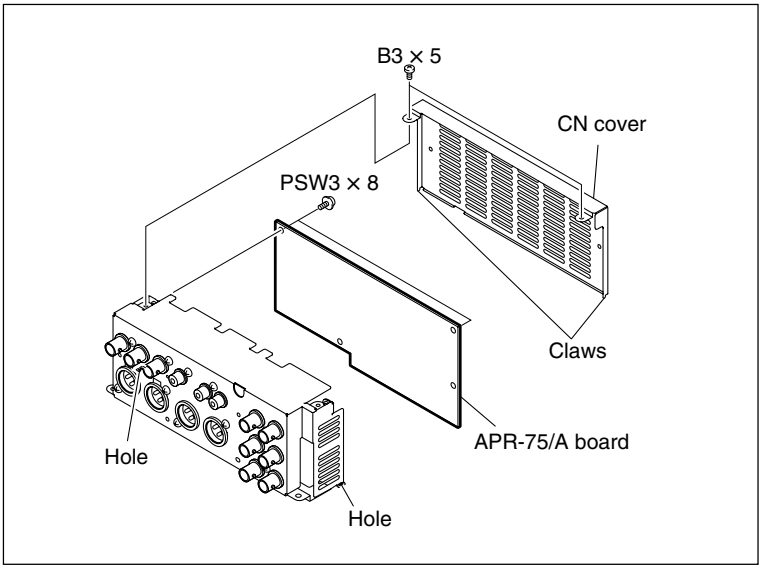


4. Remove the two screws to detach the CN cover.

   Note

   When reattaching the CN cover, fit its two claws into the holes.

5. Remove the two screws and remove the APR-75/A board.



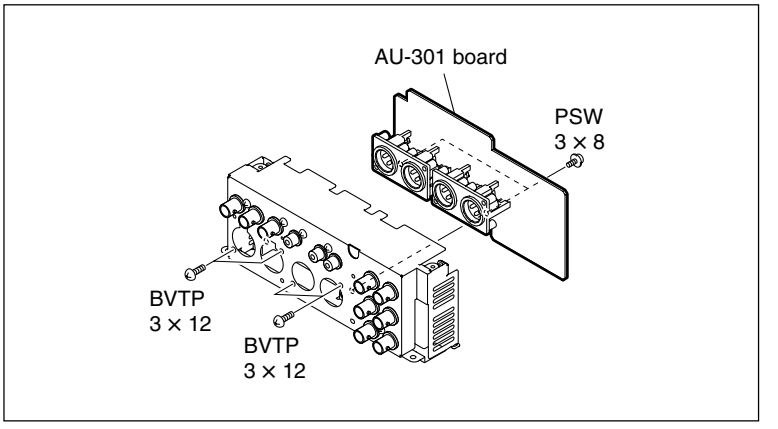
Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 5 of removal.

6-17-2. AU-301/A Board

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the connector panel.
   (Refer to Section 1-9-3.)
3. Remove the APR-75/A board.
   (Refer to Section 6-17-1.)
4. Remove the six screws to detach the AU-301 board.



Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 4 of removal.

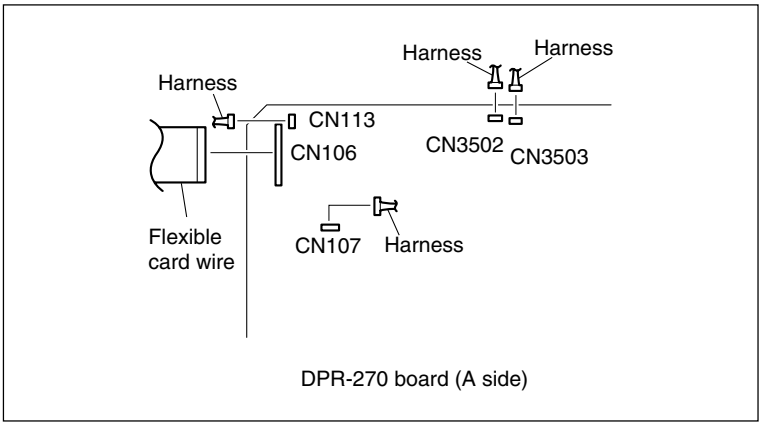
6-17-3. DPR-270/A Board

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the power supply unit.
   (Refer to Section 6-2.)
3. Remove the connector panel.
   (Refer to Section 1-9-3.)
4. Remove the connector board assembly.
   (Refer to Section 6-17-1 step 4.)
5. Remove the ENC-101 board.
   (Refer to Section 6-17-6.)
6. Remove the MS-80 board.
   (Refer to Section 6-17-10.)
7. Remove the RX-93A/B board.
   (Refer to Section 6-17-11.)
8. Disconnect the harnesses from CN113, CN107, CN3502, and CN3503, and the flexible card wire from CN106.

   Note

   Be very careful not to fold the flexible card wire. The life of the flexible card wire will be significantly shortened if it is folded.

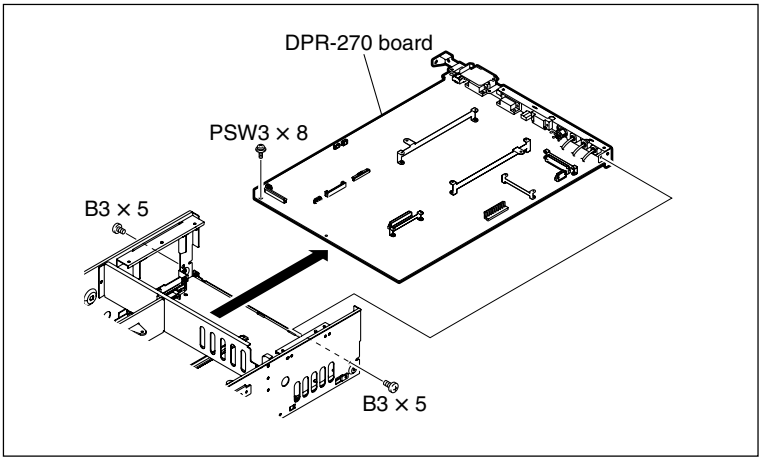


DPR-270 board (A side)

9. Remove the three screws, and remove the DPR-270 board in the arrow direction.

   Note

   Be careful so that the harnesses are not caught when reinstalling the DPR-270 board.



Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 9 of removal.

   Note

   Be sure to install the connector panel, and then install the power supply unit.

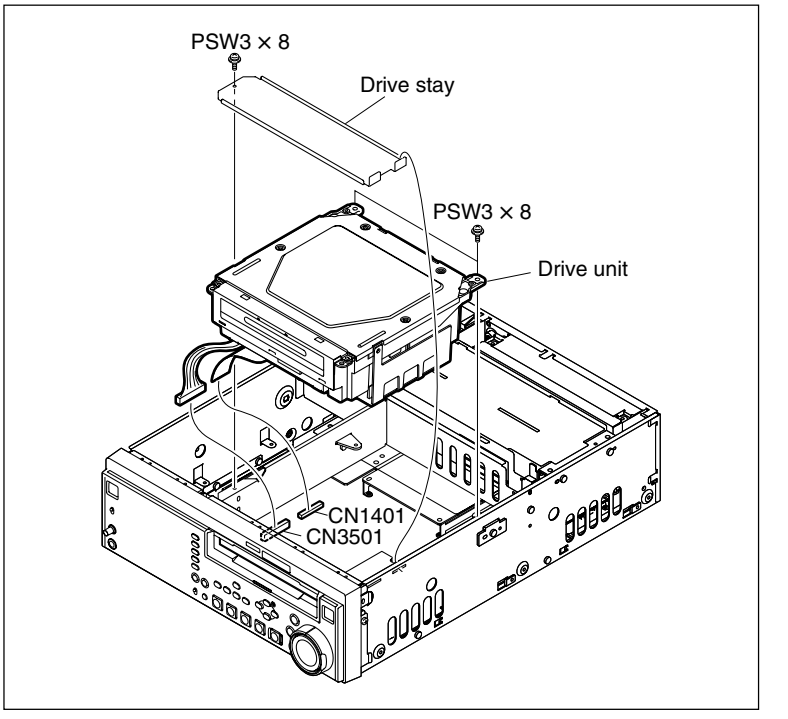
6-17-4. DR-550G Board

Note

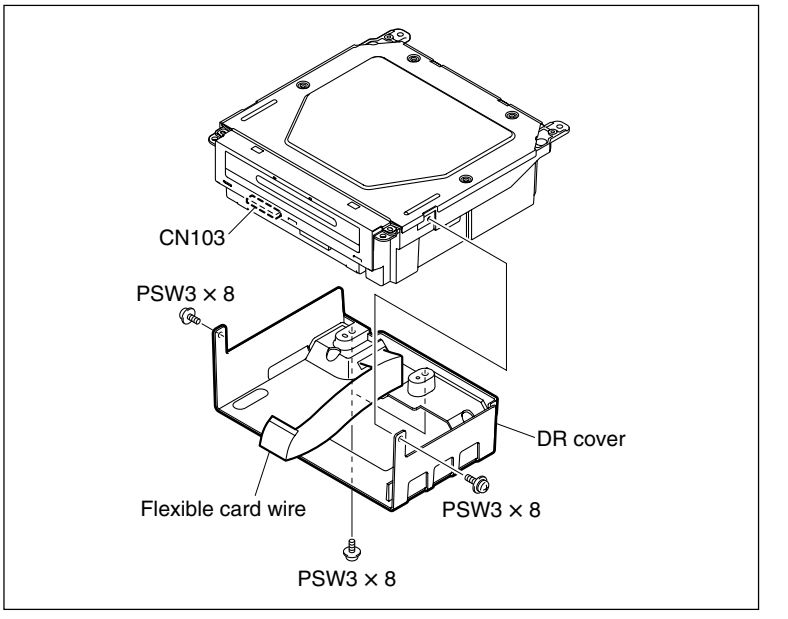
The DR-550G board is equipped with an EEPROM IC603 that stores drive maintenance adjustment data, hours meter data, and other data. When replacing the DR-550G board, remove IC603 from the board and then mount it on the new DR-550G board.

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Disconnect the harness from the connector CN3501, and disconnect the flexible card wire from the connector CN1401.
   Note
   Be very careful not to fold the flexible card wire. The life of the flexible card wire will be significantly shortened if it is folded.
3. Remove the screw, and remove the drive stay.
4. Remove the two screws, and remove the drive unit.



5. Unlock the connector CN103.
6. Remove the four screws, and remove the DR cover and the flexible card wire.

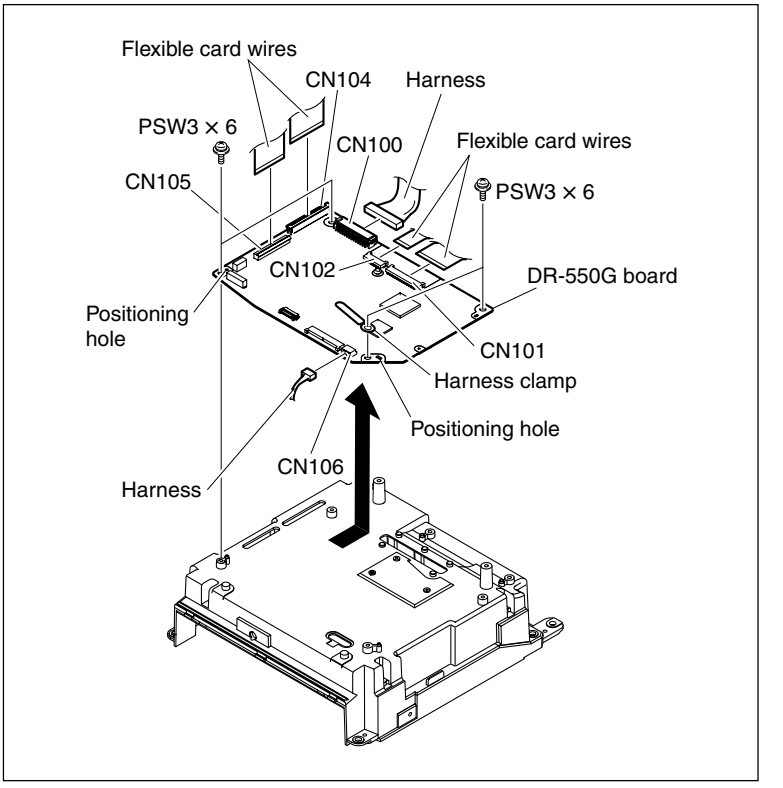


7. Disconnect the harnesses from the connectors CN100, CN106.
8. Disconnect the flexible card wires from the connectors CN101, CN102, CN104, and CN105.

Notes

- Be very careful not to fold the flexible card wire. The life of the flexible card wire will be significantly shortened if it is folded.
- The cover of the dustproof rubber of the flexible card wire connected to CN101 or CN102 is closed with the projecting length is adjusted. Do not open the cover or pull the flexible card wire.

9. Remove the four screws and the harness clamp, and remove the DR-550G board in the arrow direction.



Replacing

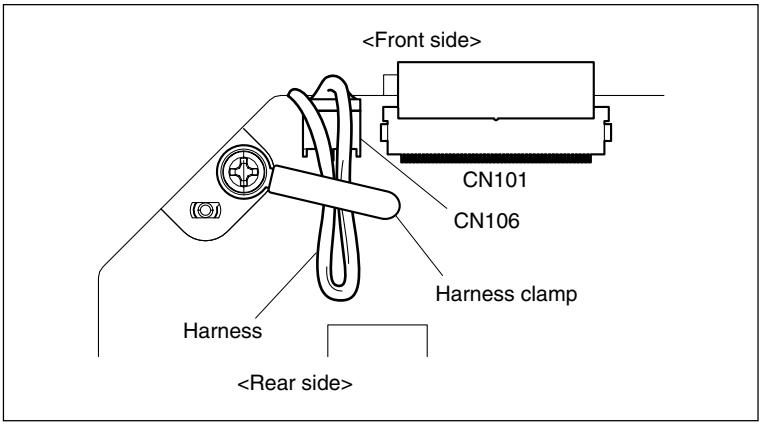
1. When replacing the DR-550G board, remove IC603 from the board and then mount it on the new DR-550G board.

Reattaching

1. Reattach the removed parts by reversing steps 7 to 9 of removal.

Note

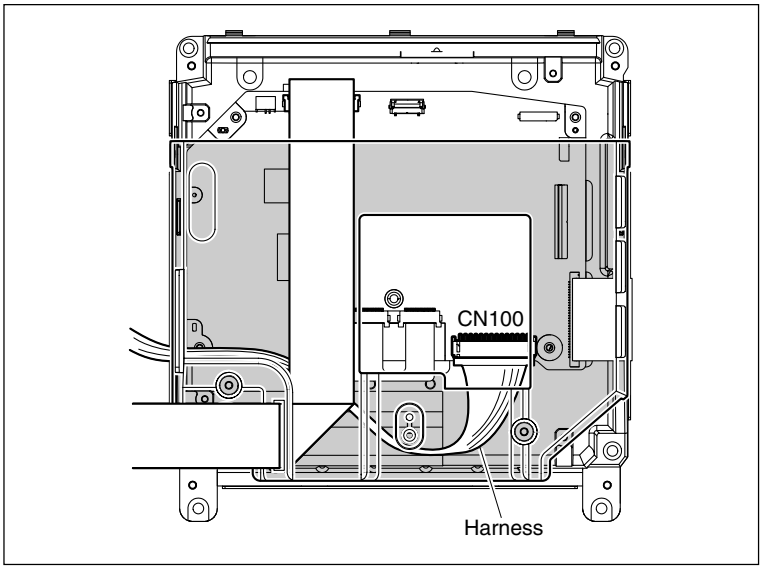
Arrange the harness as shown in the figure, and clamp it with the harness clamp.



2. Reattach removed parts by reversing steps 5 to 6 of removal.

Note

Arrange the harness as shown in the figure.



3. Reattach removed parts by reversing steps 1 to 4 of removal.

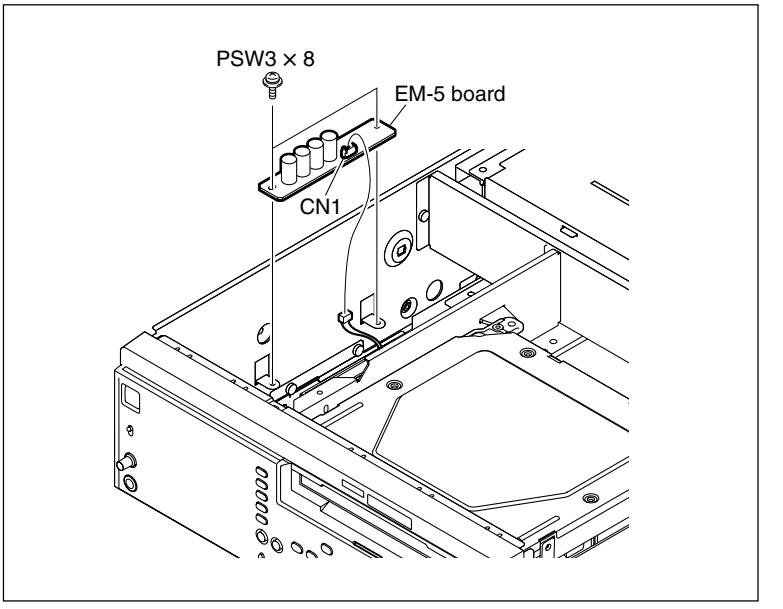
6-17-5. EM-5 Board

Note

The EM-5 board require periodic replacement.
Refer to “5-1-3. Periodic Check/Replacement Parts List” for details.

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Disconnect the harness from CN1.
3. Remove the two screws to detach the EM-5 board.



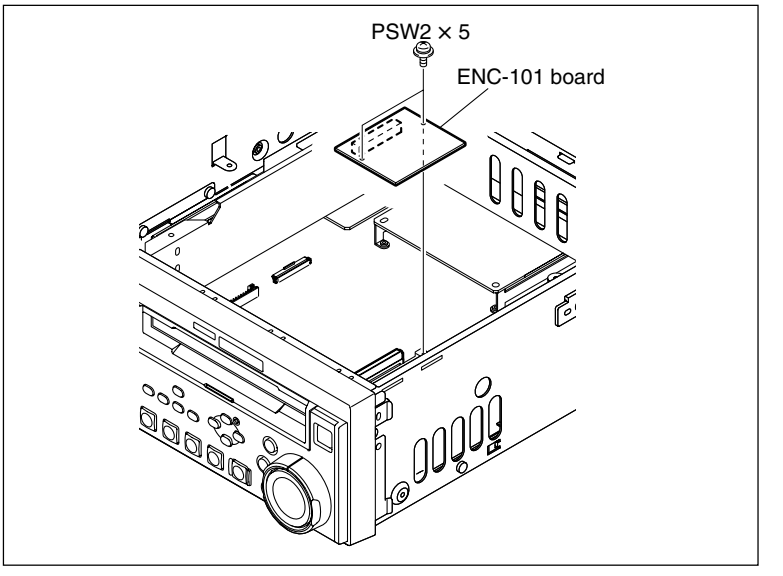
Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 3 of removal.

6-17-6. ENC-101 Board

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the drive unit assembly.
   (Refer to Step 4 in Section 6-17-4.)
3. Remove the two screws to detach the ENC-101 board.



Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 3 of removal.

6-17-7. HN-300G Board

Notes

- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits. Keep magnetic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If the magnetic substance is moved close to these parts, their characteristics may be changed.
- Be careful so that the optical block assembly does not touch your workbench in removing/reattaching the HN-300G board to avoid scratches on the lens or damage to the actuator.

Removal

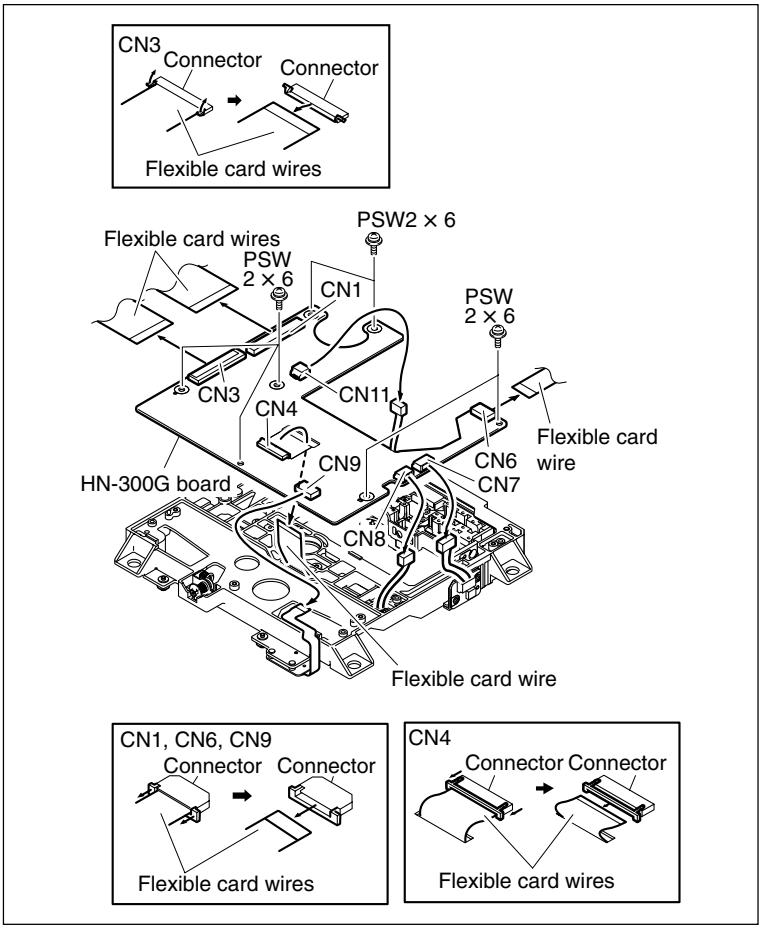
1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the DR-550G board.
   (Refer to Section 6-17-4.)
3. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
4. Remove the loader (P1) assembly.
   (Refer to Section 6-5.)
5. Remove the drive (P10) sub assembly.
   (Refer to Section 6-8.)

6. Unlock the connectors CN6, CN9, CN4, CN3, and CN1 on the HN-300G board, and disconnect the flexible card wires from them. Also, disconnect the harnesses from the connectors CN11, CN7, and CN8.

Note

Be very careful not to fold the flexible card wire. The life of the flexible card wire will be significantly shortened if it is folded.

7. Remove the seven screws, and remove the HN-300G board.



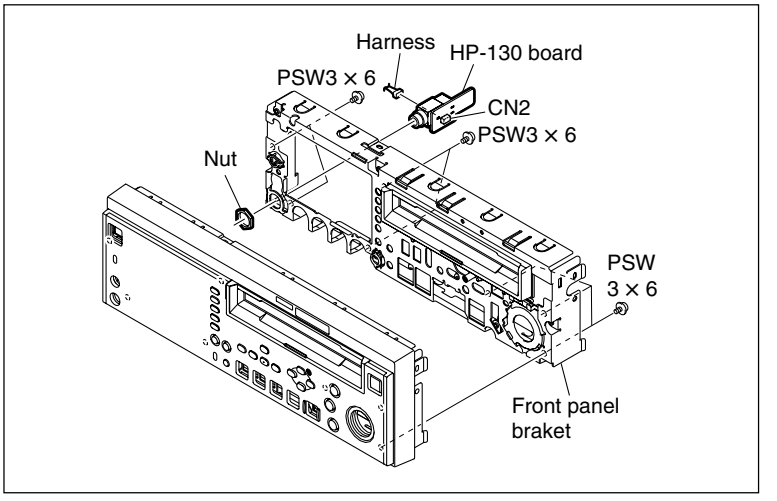
Reinstallation

1. Reinstall the HN-300G board by reversing steps 1 to 7 of removal.
   Tightening torque:
   $20 \times 10^{-2} \pm 0.01$ N•m {2.0 ± 0.1 kgf•cm}

6-17-8. HP-130 Board

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the front panel assembly.
   (Refer to Section 1-9-2.)
3. Remove the KY-580/A/B board.
   (Refer to Section 6-17-9.)
4. Remove the seven screws to detach the front panel bracket.
5. Disconnect the harness from CN2.
6. Remove the nut to detach the HP-130 board.



Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 6 of removal.

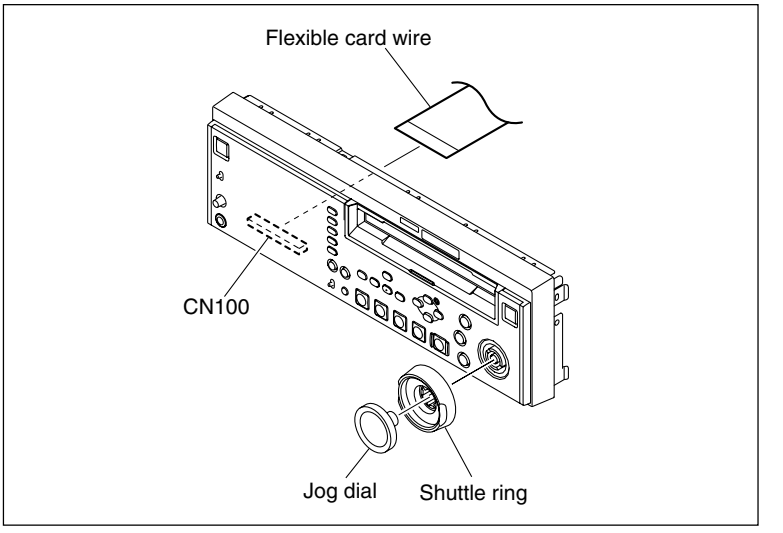
6-17-9. KY-580/A/B Board

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the front panel assembly.
   (Refer to Section 1-9-2.)
3. Remove the jog dial and the shuttle ring.
4. Disconnect the flexible card wire from CN100.

   Note

   Be very careful not to fold the flexible card wire. The life of the flexible card wire will be significantly shortened if it is folded.



5. Remove the screw to detach the KY support.

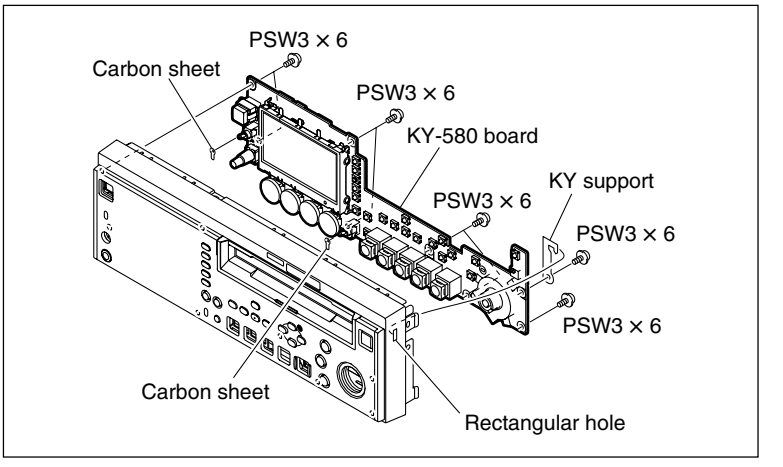
   Note

   When reinstalling the KY support, fit its hook into the rectangular hole.

6. Remove the seven screws to detach the KY-580 board.

   Note

   Be careful not to lose the two carbon sheets.



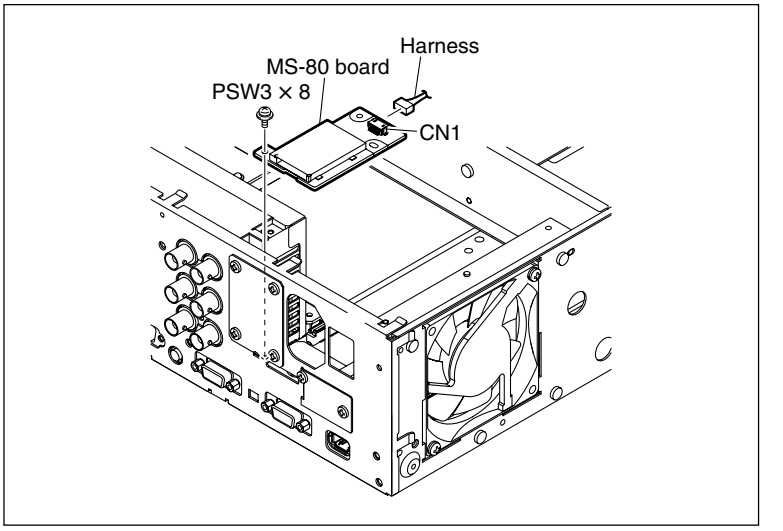
Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 6 of removal.

6-17-10. MS-80 Board

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the power supply unit.
   (Refer to Section 6-2.)
3. Disconnect the harness from CN1.
4. Remove the screw to detach the MS-80 board.



Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 4 of removal.

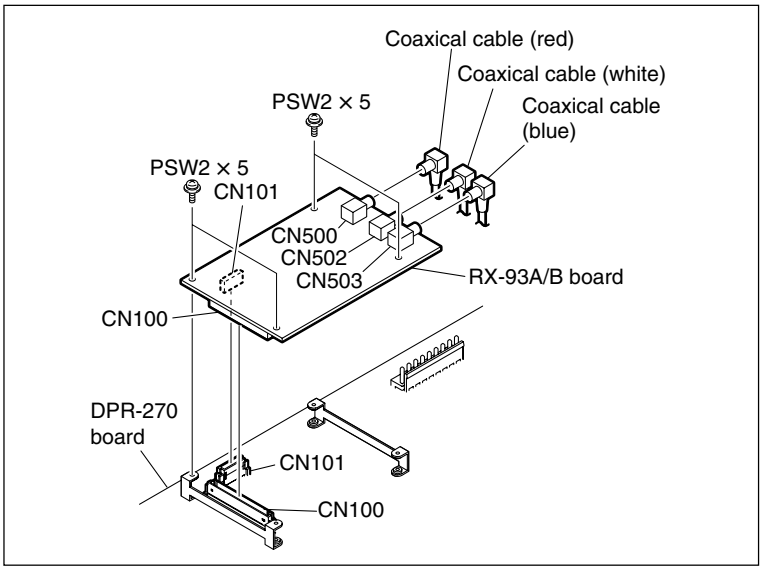
6-17-11. RX-93A/B Board

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the power supply unit.
   (Refer to Section 6-2.)
3. Disconnect the coaxial cables from CN500, CN502, and CN503.
4. Remove the four screws to detach the RX-93A/B board.

   Note

   When reinstalling the RX-93A/B board, couple the two connectors on the board securely.



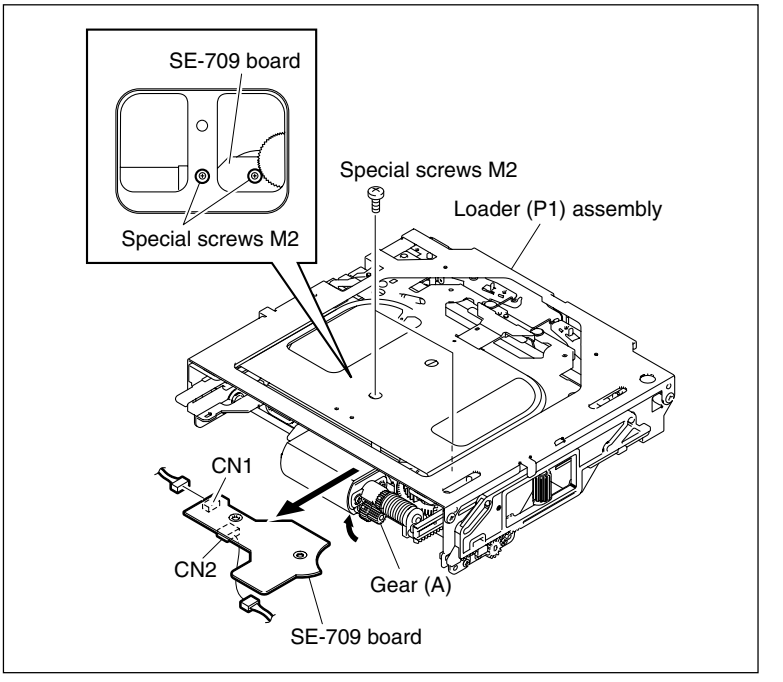
Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 4 of removal.

6-17-12. SE-709 Board

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
3. Remove the loader (P1) assembly.
   (Refer to Section 6-5.)
4. If the cartridge has not been ejected normally, turn the gear (A) in the direction of the arrow to move the screw of the SE-709 board under the hole in the loader (P1) assembly.
   Note
   Skip this step when the cartridge has been ejected normally.
5. Remove the two screws, disconnect the harness from the connector CN2, and remove the SE-709 board from the loader (P1) assembly.
6. Disconnect the harness from the connector CN1 on the SE-709 board.



Reinstallation

1. Reinstall the SE-709 board by reversing steps 1 to 6 of removal.
   Tightening torque:
   $20 \times 10^{-2} \pm 0.01$ N•m {2.0 ±0.1 kgf•cm}

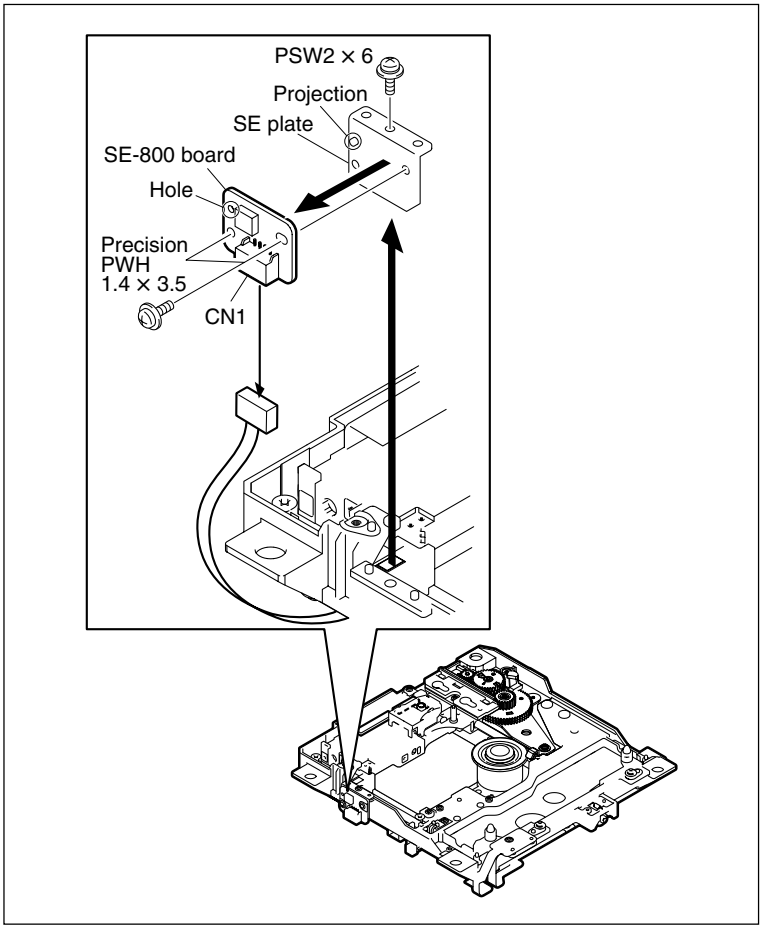
6-17-13. SE-800 Board

Notes

- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits. Keep magnetic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If the magnetic substance is moved close to these parts, their characteristics may be changed.

Removal

1. Remove the top panel. (Refer to Section 1-9-1.)
2. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
3. Remove the loader (P1) assembly. (Refer to Section 6-5.)
4. Remove the upper screw (PSW2 × 6), and remove the SE plate together with the SE-800 board.
5. Disconnect the harness from the connector CN1 on the SE-800 board.
6. Remove the two screws (PWH1.4 × 3.5), and remove the SE-800 board from the SE plate.



Reinstallation

1. Reinstall the SE-800 board by reversing steps 1 to 6 of removal.

   Note

   - Slide the projection on the SE plate into the hole of the SE-800 board.

   Tightening torques

   PWH1.4 × 3.5:
   $10 \times 10^{-2} \pm 0.01$ N•m {1.0 ±0.1 kgf•cm}
   PSW2 × 6:
   $20 \times 10^{-2} \pm 0.01$ N•m {2.0 ±0.1 kgf•cm}

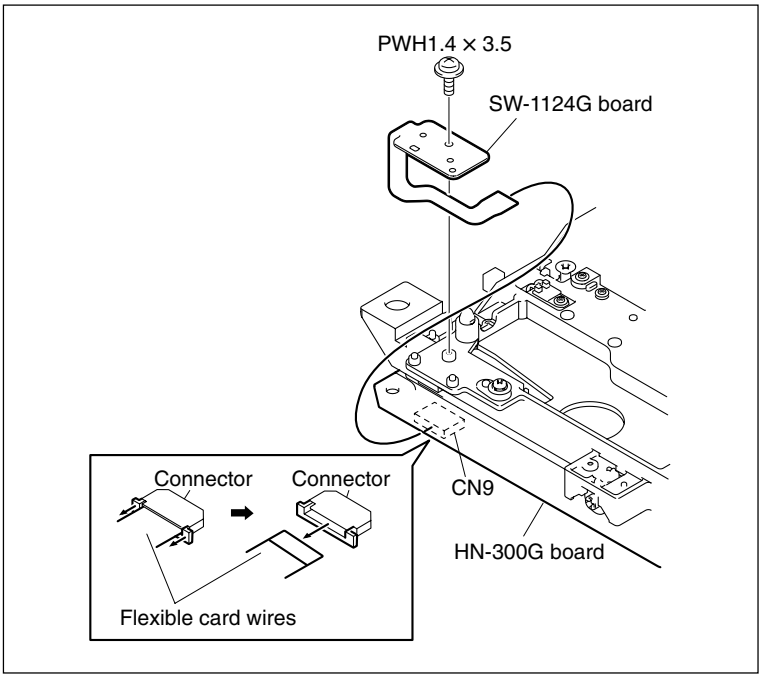
6-17-14. SW-1124G Board

Notes

- To prevent the possibility of damage to the optical block assembly in the drive assembly by static electricity charged in a human body or clothes, be sure to establish a ground before starting the service operation. (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits. Keep magnetic substance away from these parts. If the magnetic force makes a screwdriver hit the actuator, the objective lens will be damaged. If the magnetic substance is moved close to these parts, their characteristics may be changed.

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the DR-550G board.
   (Refer to Section 6-17-4.)
3. Remove the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
4. Remove the loader (P1) assembly.
   (Refer to Section 6-5.)
5. Remove the drive (P10) sub assembly.
   (Refer to Section 6-8.)
6. Unlock the connector CN9 on the HN-300G board, and disconnect the flexible card wire.
   Note
   Be very careful not to fold the flexible card wire. The life of the flexible card wire will be significantly shortened if it is folded.
7. Remove the screw, and remove the SW-1124G board.



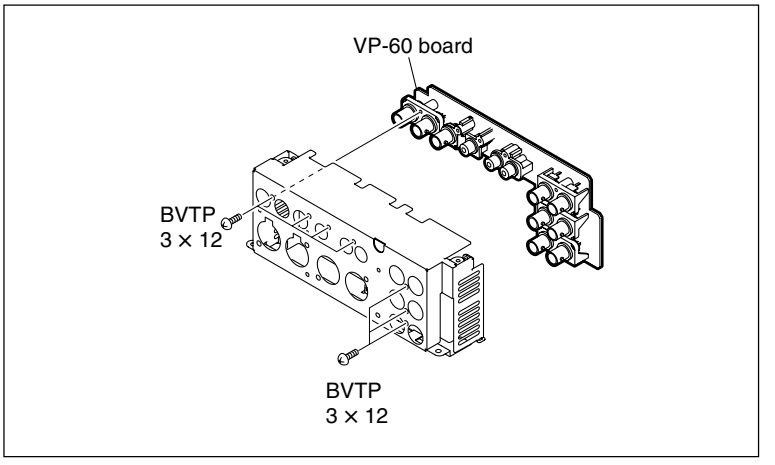
Reattaching

1. Reinstall the SW-1124G board by reversing steps 1 to 7 of removal.
   Tightening torque:
   $10 \times 10^{-2} \pm 0.01$ N•m {1.0 ±0.1 kgf•cm}

6-17-15. VP-60/A Board

Removal

1. Remove the top panel.
   (Refer to Section 1-9-1.)
2. Remove the connector panel.
   (Refer to Section 1-9-3.)
3. Remove the APR-75/A board.
   (Refer to Section 6-17-1.)
4. Remove the AU-301/A board.
   (Refer to Section 6-17-2.)
5. Remove the seven screws to detach the VP-60 board.



Reinstallation

1. Reinstall the removed parts by reversing steps 1 to 5 of removal.

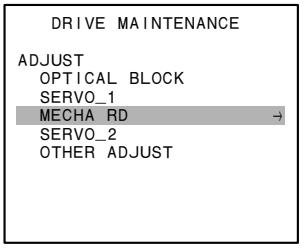
Section7
Optical Drive Alignment

7-1. Optical Block Mechanical Alignment

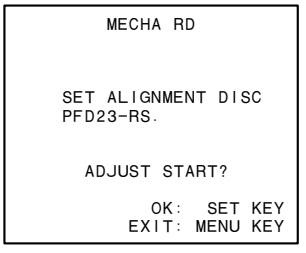
7-1-1. How to Move Optical Block Assembly

This section describes how to move the optical block assembly during the RD checking or RD adjustment.

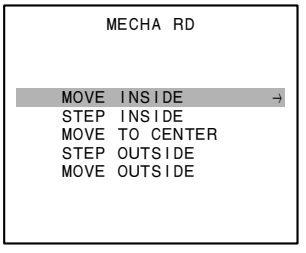
1. Display the DRIVE MAINTENANCE MENU.
2. Select “ADJUST” using the [↑]/[↓] buttons, and press the [→] button.
3. Select “MECHA RD” using the [↑]/[↓] buttons, and press the [→] button.



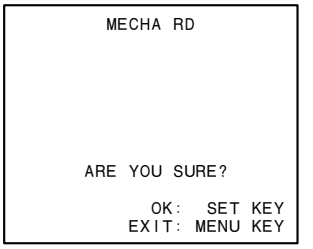
4. A confirmation screen appears.
   Set a cartridge, and press the [SET] button.



5. Select “MOVE INSIDE” or “MOVE OUTSIDE” using the [↑]/[↓] buttons, and press the [→] button.
   - MOVE INSIDE: The optical block assembly moves to the IN side.
   - MOVE OUTSIDE: The optical block assembly moves to the OUT side.



6. A confirmation screen appears.
   Press the [SET] button.



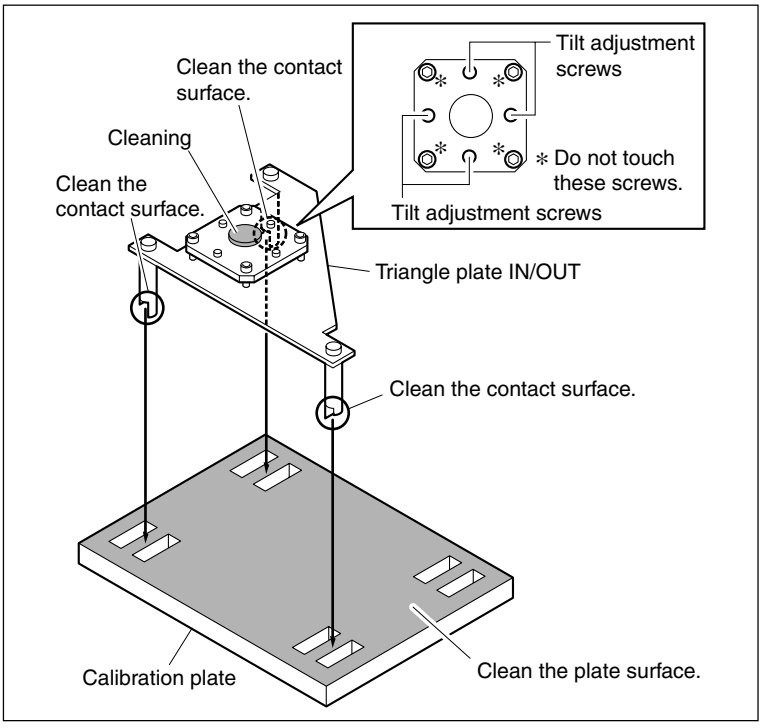
7. “SLIDER MOVING...” appears and the optical block assembly moves.
8. When the movement is completed nomally, the screen in step 5 appears.
9. When the RD checking or RD adjustment finishes, press the [MENU] button to end the DRIVE MAINTENANCE MENU.

7-1-2. Calibrating Triangle Plates

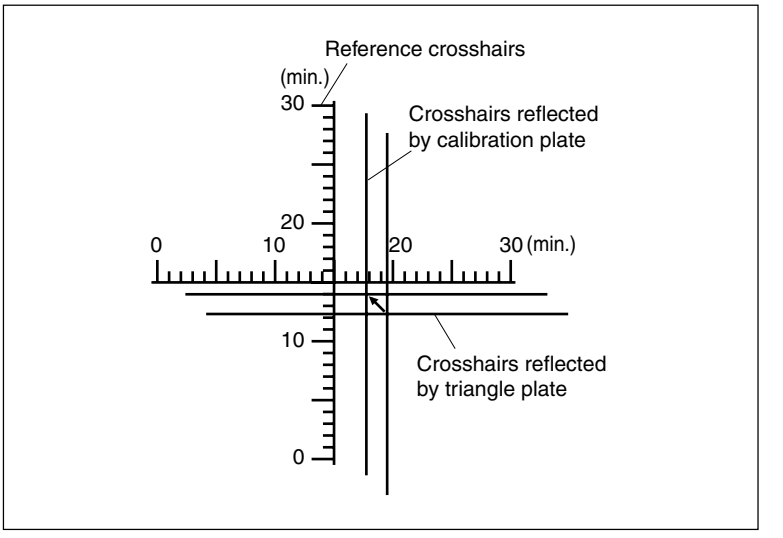
Calibrate the skew of the reference surface of each triangle plate with the calibration plate using the following procedure:

1. Clean the surface of the calibration plate, the reference surfaces of the triangle plates IN/OUT, and their legs to be touched to the calibration plate, using the cleaning cloth with the cleaning liquid soaked.
   Note
   Be careful not to sit fibers of the cleaning cloth on the cleaning surface of each part.

2. Insert the legs of the triangle plate into the holes of the calibration plate to place the triangle plate on the calibration plate.
3. Confirm that the two reflected crosshairs are visible through the eyepiece of the auto-collimator.



4. Confirm that the two reflected crosshairs are overlapped. If not, perform the following adjustment.
5. Slightly turn the tilt adjustment screws on the triangle plate so that the crosshairs reflected by the triangle plate matches with the crosshairs reflected by the calibration plate.
   Notes
   - Before this adjustment, apply a drop of alcohol to the locking compound on the tilt adjustment screws to melt the locking compound a little.
   - When fine adjusting the crosshairs, turn the adjustment screws clockwise. Be sure not to turn the screws counterclockwise to loose it. If the two crosshairs does not match even after the screws are fully turned clockwise, turn them counterclockwise once, and turn them clockwise again to fine adjust it.
   - Fine adjust the crosshairs by turning the adjustment screws equally, not by turning only one screw.
   - After the adjustment, apply the locking compound to each adjustment screw.



7-1-3. Adjustments After Replacing Optical Block Assembly

After replacing the optical block assembly, perform the following adjustments in descending order:

- Skew adjustment
- Optical Block Assembly Data Setting
- Laser Initial Data Setting
- Servo1 Automatic Adjustment
- RD adjustment
- Servo2 Automatic Adjustment
- Clear media log

This section describes the adjustments to be performed after the optical block assembly replacement.

Fixtures

• BRD-P1/P2 reflection block for auto-collimator (PW-003):	For skew adjustment
• Triangle plates IN/OUT (PW-001):	For skew adjustment
• Calibration plate:	For skew adjustment
• Auto-collimator (Nikon 6D):	For skew adjustment
• Torque driver (For 3 kg):	For skew adjustment
• Bit for torque driver (M2):	For skew adjustment
• Hexagonal wrench driver:	For skew adjustment
• RD adjustment screwdriver (PW-005):	For RD adjustment
• KES-110A E&F LPF box:	For RD adjustment
• 2-channel oscilloscope:	For RD adjustment
• Alignment Disc (PFD23-RS):	For RD adjustment
• Regulated power supply:	For RD adjustment
• Cleaning liquid	
• Cleaning cloth	
• Oil (LX-206)	
• Locking compound	

Skew Adjustment

Preparations Before Adjustment:

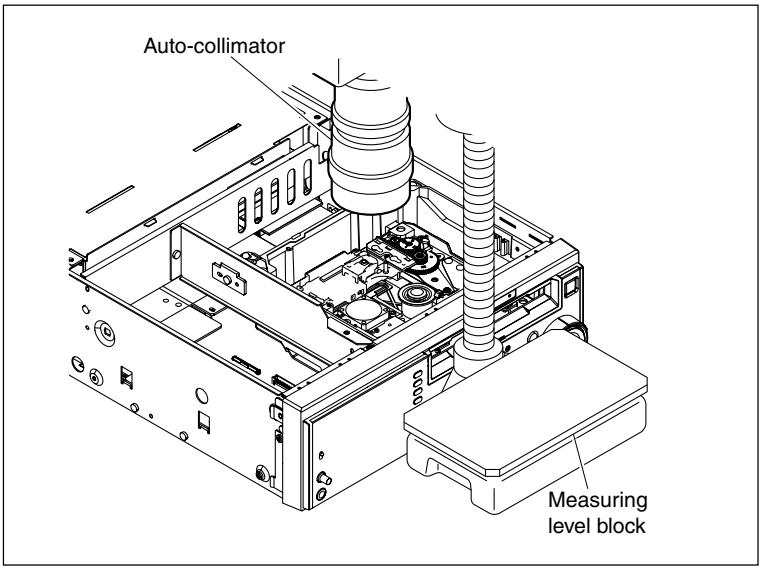
- Perform the dioptric adjustment and the crosshairs focus adjustment for the auto-collimator. Refer to the operation manual of the auto-collimator for details.
- Remove the loader (P1) assembly from the optical block assembly.
- Calibrate the triangle plates. (Refer to Section 7-1-2.)

Adjustment Procedure

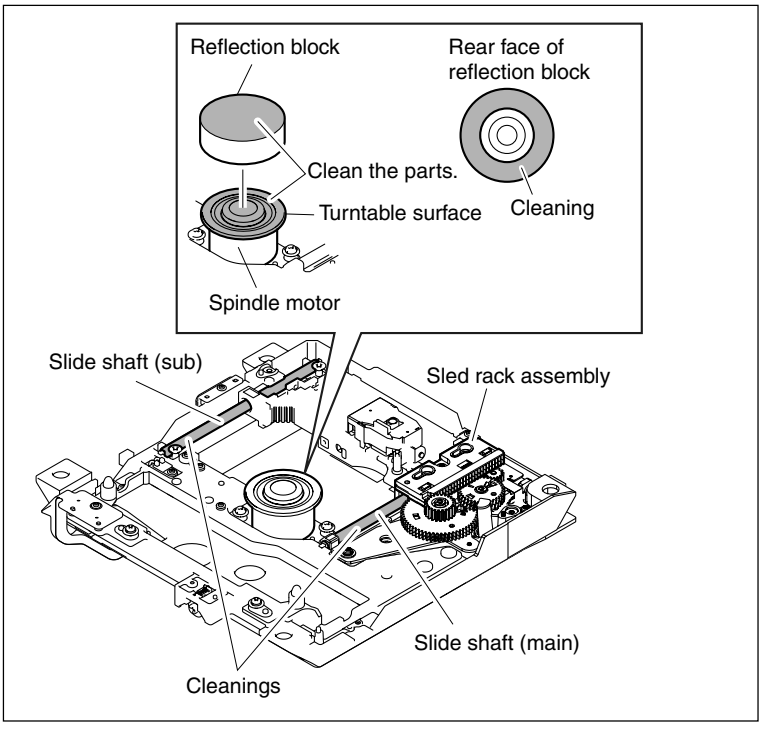
1. Put the unit beside the auto-collimator in the orientation shown in the figure.

   Notes

   - The specifications (α and β) described in the following are the values when the unit is placed as shown in the figure.
   - Make the skew adjustment on a stable workbench.



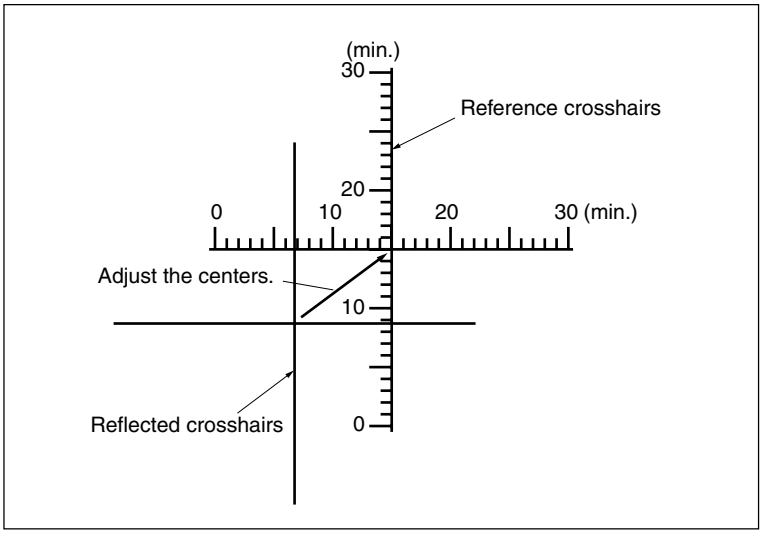
2. Clean the turntable of the spindle motor of the unit using the cleaning cloth with the cleaning liquid soaked.
3. While holding the sled rack assembly and moving the optical block assembly inward and outward, clean the slide shaft.
4. Put the cleaned reflection block on the turn table of the spindle motor.



5. Adjust the position and skew of the unit so that the reflected crosshairs (crosshairs reflected by the reflection block) become visible through the eyepiece of the auto-collimator.

   Note

   Put several pieces of paper (or a similar item) between the unit and the workbench. Adjust the skew of the unit so that the paper is not slipped.



6. When the reflected crosshairs become visible, turn the X-Y direction adjustment handle of the auto-collimator to match the center of the reflected crosshairs and the center of the reference crosshairs (crosshairs on the eyepiece).

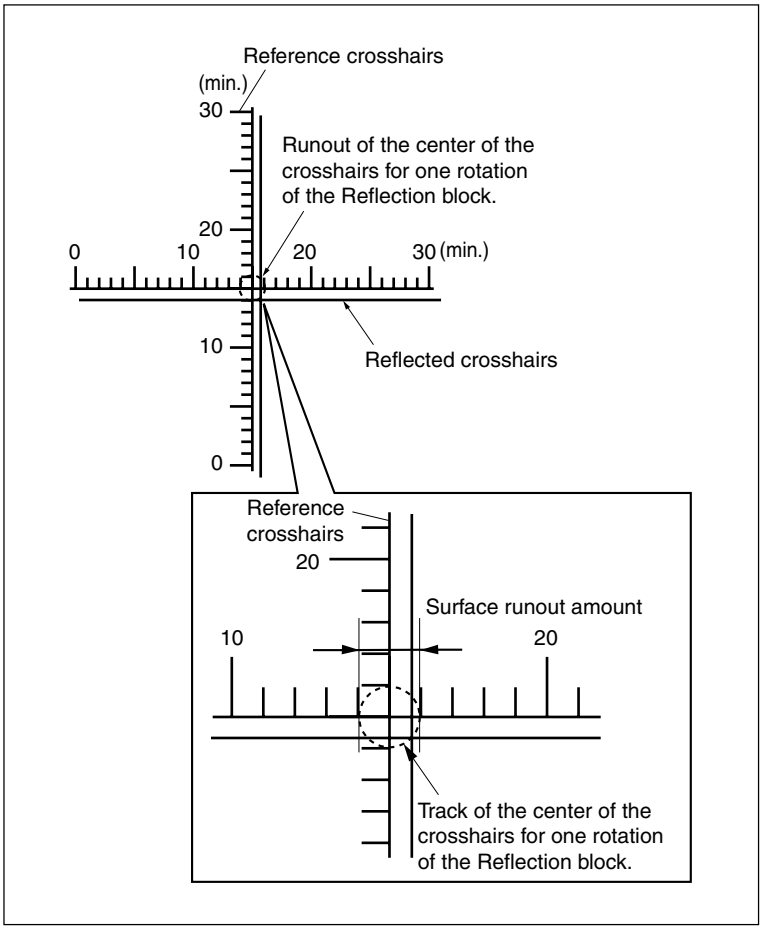
7. Turn slowly the reflection block on the spindle motor 360 degrees with fingers to check through the eyepiece that the surface runout amount at the center of the reflected crosshairs satisfies the specification.

   Specification

   Surface runout amount:
   3.5 minutes or less (3.5 tick marks or less on the reference crosshairs of the eyepiece)

   Note

   When the specification is not satisfied, clean the turntable of the spindle motor again and recheck the value.

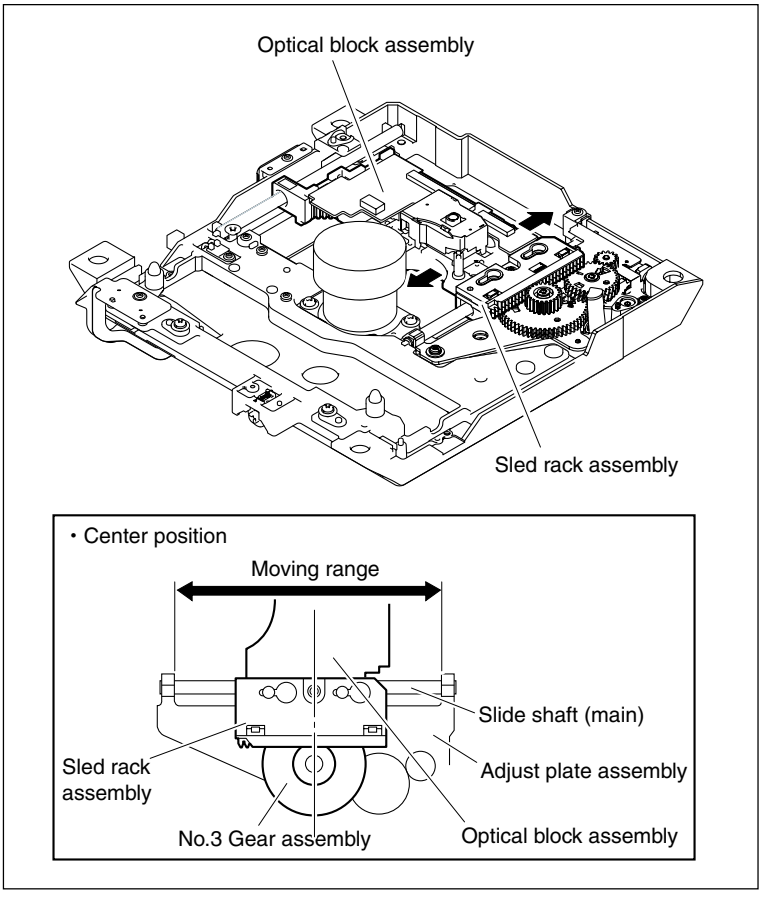


8. Align the center of the runout width of the reflected crosshairs with the center of the reference crosshairs again, using the X-Y direction adjustment handle.

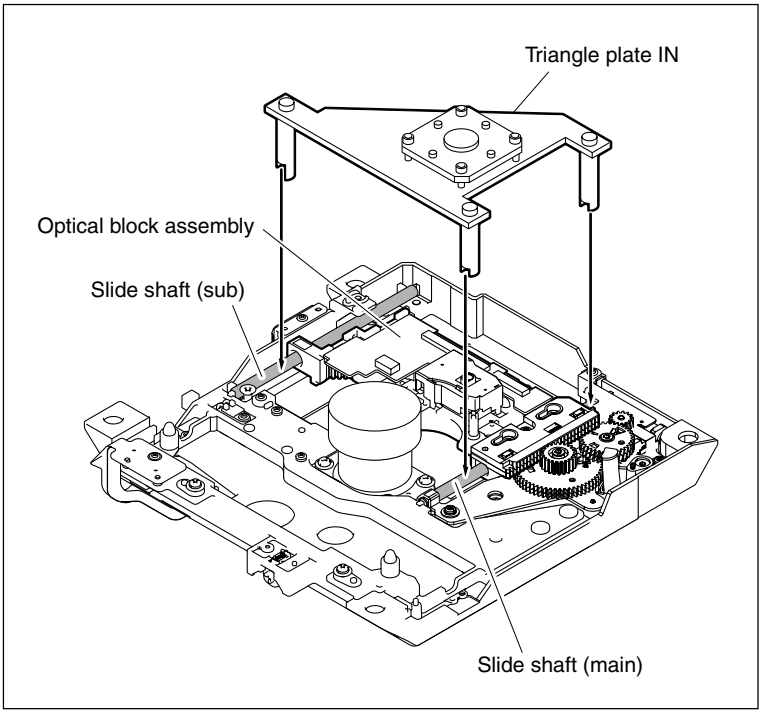
   Note

   Be sure not to change the position and the skew of the unit and not to touch the X-Y direction adjustment handle of the auto-collimator until the skew adjustment is completed.

9. Hold the sled rack assembly to move the optical block assembly to the center of the moving range.



10. Set the triangle plate IN, whose legs have been cleaned, in the orientation shown in the figure.



11. Turn the tangential and radial skew adjustment screws shown in the figure to adjust the center of the crosshairs reflected by the triangle plate IN to the center of the surface runout of the crosshairs reflected by the reflection block using the auto-collimator. The radial skew adjustment screw is mainly used for the adjustment of the direction of the arrow A. The tangential skew adjustment screw is mainly used for the adjustment of the direction of the arrow B.

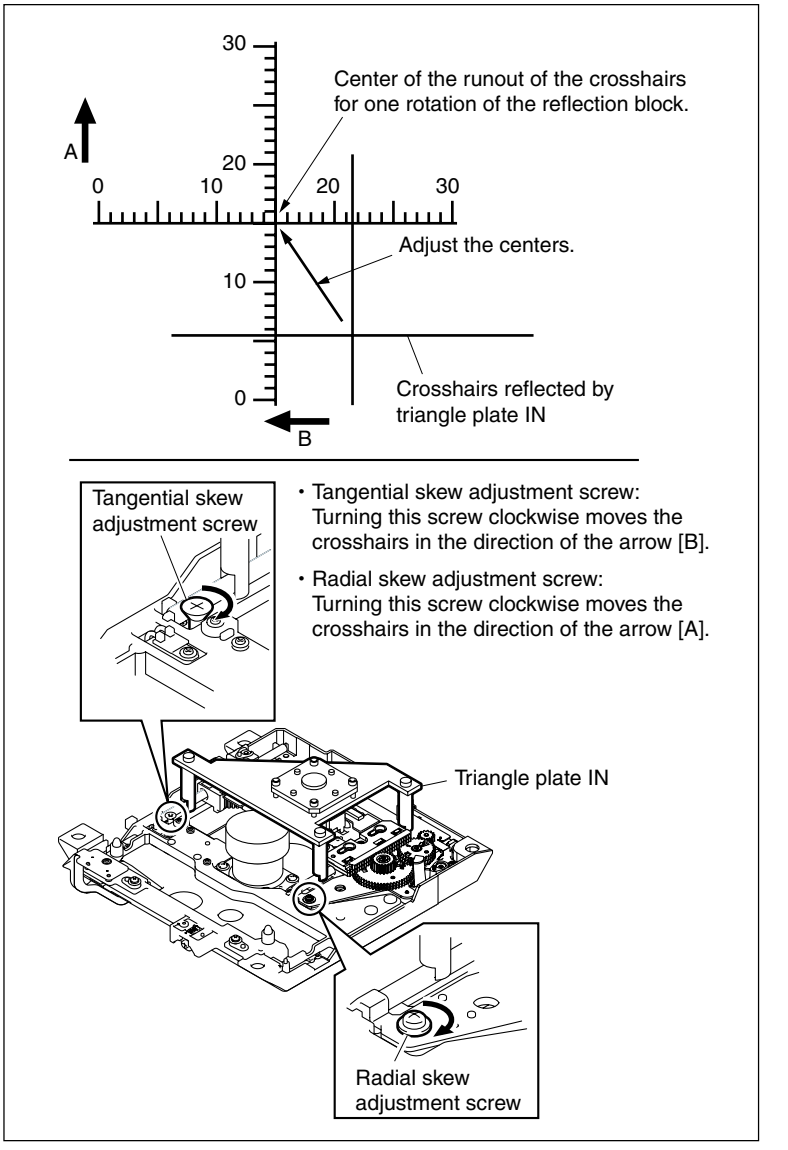
Notes

- Adjust both the adjustment screws equally.
- The adjustment screws should be turned clockwise for this adjustment. If they are turned too much, turn them back sufficiently, and turn them clockwise again.

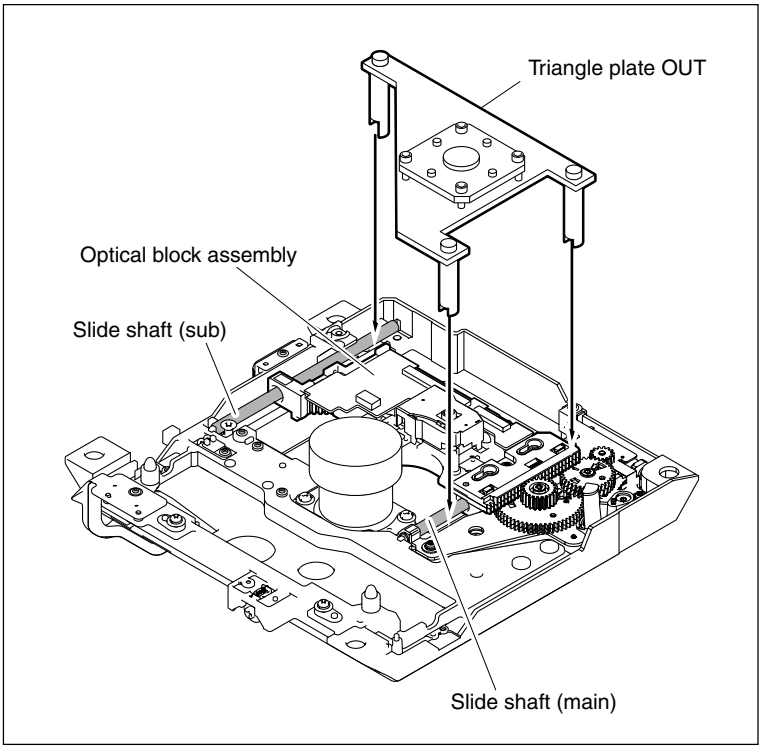
Note

Radial skew: Skew in the direction of movement of the optical block assembly

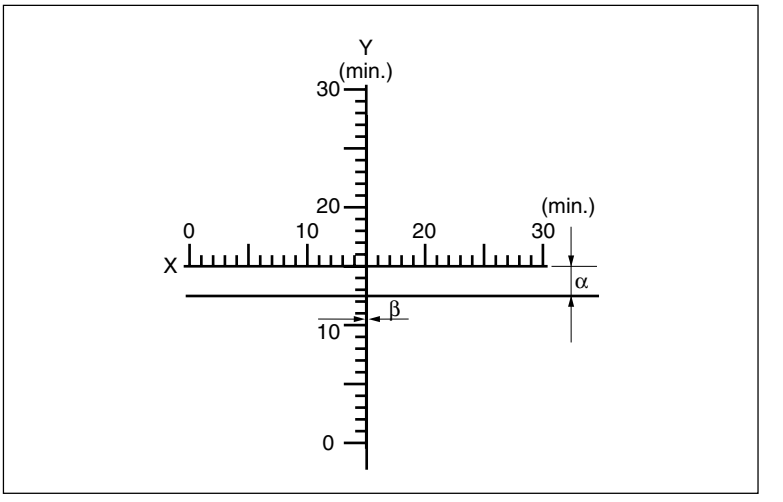
Tangential skew: Skew perpendicular to the radial skew


30
20
10
0
A
B
0
10
20
30
Center of the runout of the crosshairs for one rotation of the reflection block.
Adjust the centers.
Crosshairs reflected by triangle plate IN
Tangential skew adjustment screw
• Tangential skew adjustment screw: Turning this screw clockwise moves the crosshairs in the direction of the arrow [B].
• Radial skew adjustment screw: Turning this screw clockwise moves the crosshairs in the direction of the arrow [A].
Triangle plate IN
Radial skew adjustment screw

12. Remove the triangle plate IN, and attach the triangle plate OUT whose legs are cleaned to the position shown in the figure.

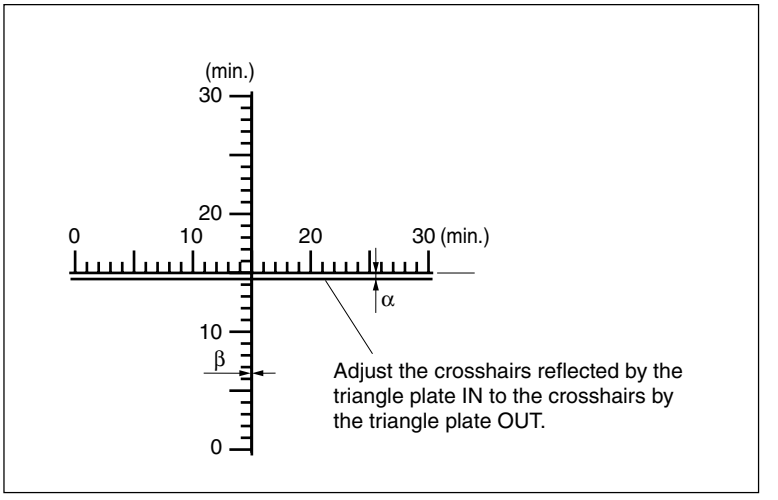


13. Adjust the radial skew (α) of the crosshairs reflected by the triangle OUT by turning the radial skew adjustment screw so that it overlaps the Y axis that is the center of the surface runout of the crosshairs reflected by the reflection block.
Measure the deviation amount (β) of the tangential skew and take a note of it.

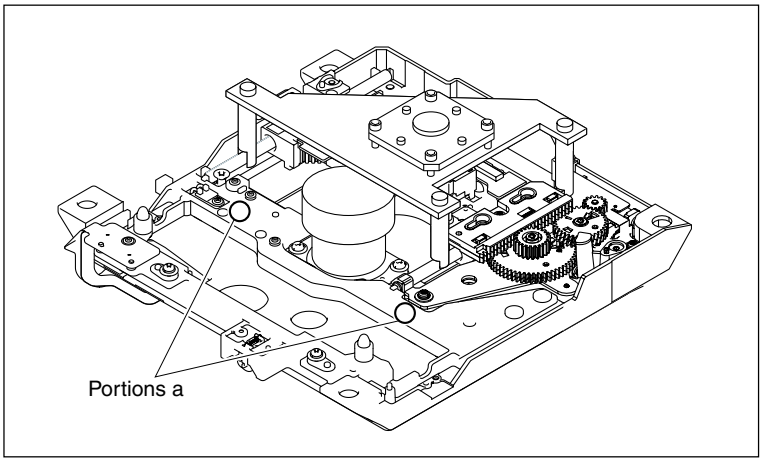


14. Remove the triangle plate OUT, and place the triangle plate IN again.
15. Adjust the tangential skew adjustment screw through the auto-collimator so that the center of the crosshairs reflected by the triangle plate IN and the center of the surface runout of the crosshairs reflected by the reflection block become the same direction and amount as the deviation (β) measured in step 13.
    If the center is deviated in the X-axis direction, fine adjust it with the radial skew adjustment screw, and check that the radial skew (α) and tangential skew (β) satisfy the specifications.
    Specifications:
    α = ±1.00 min. or less (±1 tick mark or less of the reference crosshairs on the eyepiece)
    β = ±5.00 min. or less (±5 tick marks or less of the reference crosshairs on the eyepiece)

    Notes
    - Adjust by turning both the adjustment screws equally.
    - The adjustment screws should be turned clockwise for this adjustment. If they are turned too much, turn them back sufficiently, and turn them clockwise again.
    - Match the deviation direction between IN and OUT.



16. Tap around portions a of the base plate with the tip of a screwdriver, to check that the radial skew (α) and tangential skew (β) satisfy the specifications.
    If they do not satisfy the specifications, return to step 11 to perform the adjustments again.
    Specifications:
    α = ±1.00 min. or less (±1 tick mark or less of the reference crosshairs on the eyepiece)
    β = ±5.00 min. or less (±5 tick marks or less of the reference crosshairs on the eyepiece)



17. Remove the triangle plate IN, and place the triangle plate OUT again. Then confirm that the deviation of the centers satisfies the specification.

    Note

    Match the deviation direction between IN and OUT.

Optical Block Assembly Data Setting/ Laser Initial Data Setting

1. Turn on the power.
2. Select SET OPTICAL DATA of the drive maintenance menu, and set data for the optical block assembly.
   (Refer to Section 4-4-17.)
3. Select INITIALIZE SE of the drive maintenance menu, and set initial values for the laser. (Refer to Section 4-4-18.)
4. Turn off the power.

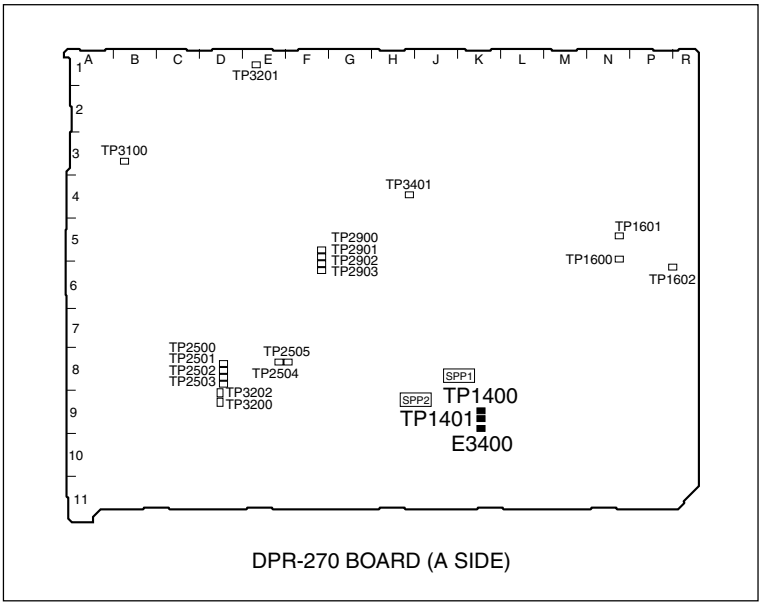
Servo1 Automatic Adjustment

1. Turn on the power.
2. Select SERVO_1 of the drive maintenance menu, and perform the servo 1 auto-adjustment. (Refer to Section 4-4-19.)
3. Turn off the power.

RD Adjustment

Preparations Before Adjustment:

- Input the voltages from the regulated power supply to the connector of the power cable supplied with the KES-110A E&F LPF box as follows.
  1pin: +12 V
  2pin: GND
  3pin: −12 V
- Connect the KES-110A E&F LPF box to the following connectors on the unit.
  TP1400/DPR-270 board
  TP1401/DPR-270 board
  E3400/DPR-270 board



DPR-270 BOARD (A SIDE)

- Connect CH-1 and CH-2 on the oscilloscope to the following connectors.
  CH-1: SPP1/KES-110A E&F LPF box
  CH-2: SPP2/KES-110A E&F LPF box
- Open the shutter of the cartridge of the alignment disc using the following procedure.
  Be sure to close it after the adjustment.

Note

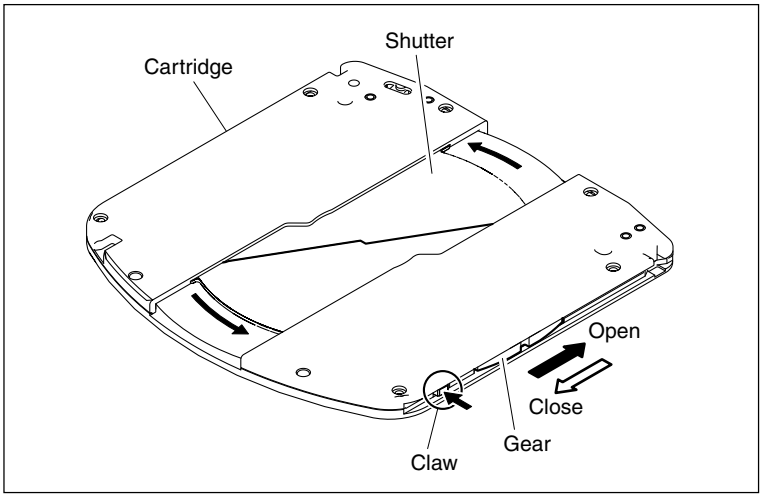
Opening the shutter of the cartridge by hand is limited to the RD check and adjustment.
Be sure not to open it for any other purpose. Do not touch the disc in the cartridge.

How to Open

Move the cover in the direction of the arrow while pressing the claw. Then move the gear by hand until the shutter is completely opened.

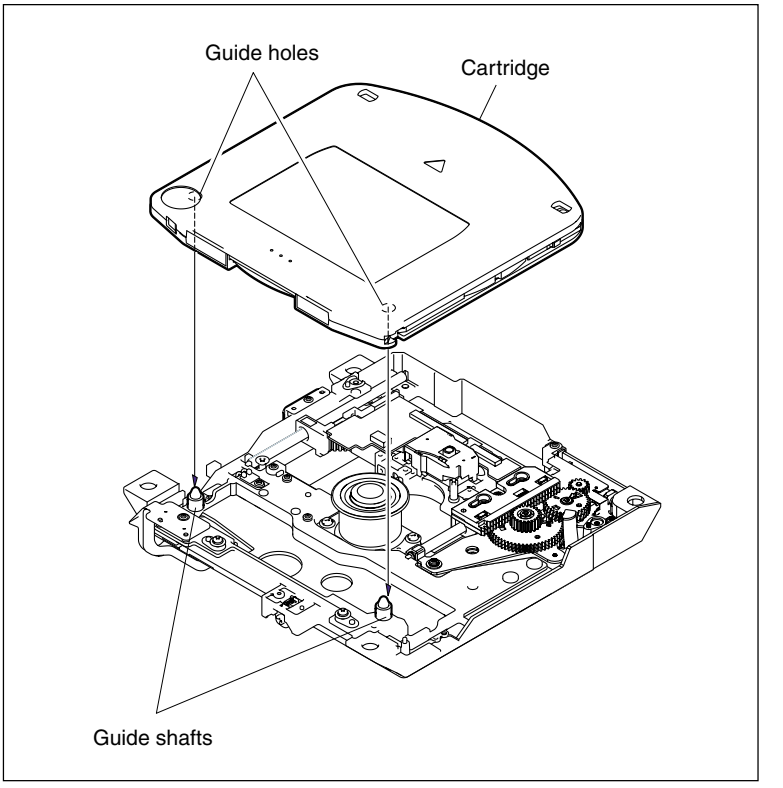
How to Close

Move the gear and the cover in the direction of the arrow until the shutter is closed and the claw snaps.

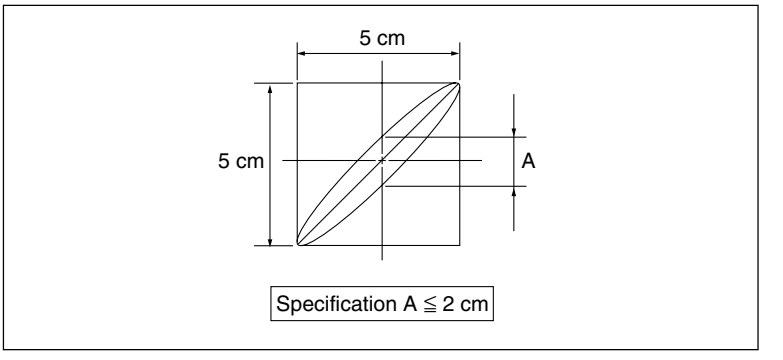


Adjustment Procedure

1. Set the cartridge with its shutter opened on the base plate so that its guide holes are aligned with the two guide shafts of the base plate.



2. Turn on the power.
3. Select MECHA RD of the drive maintenance menu, and move the optical block assembly toward “IN” using the menu.
   (Refer to Section 7-1-1.)
4. Display a lissajous waveform to make the amplitude of the horizontal and vertical directions 5 cm each.
5. Confirm that the lissajous waveform is upward.
6. Confirm that the vertical amplitude at the center of the horizontal amplitude satisfies the specification.
   If the specification is not satisfied, perform step 9.

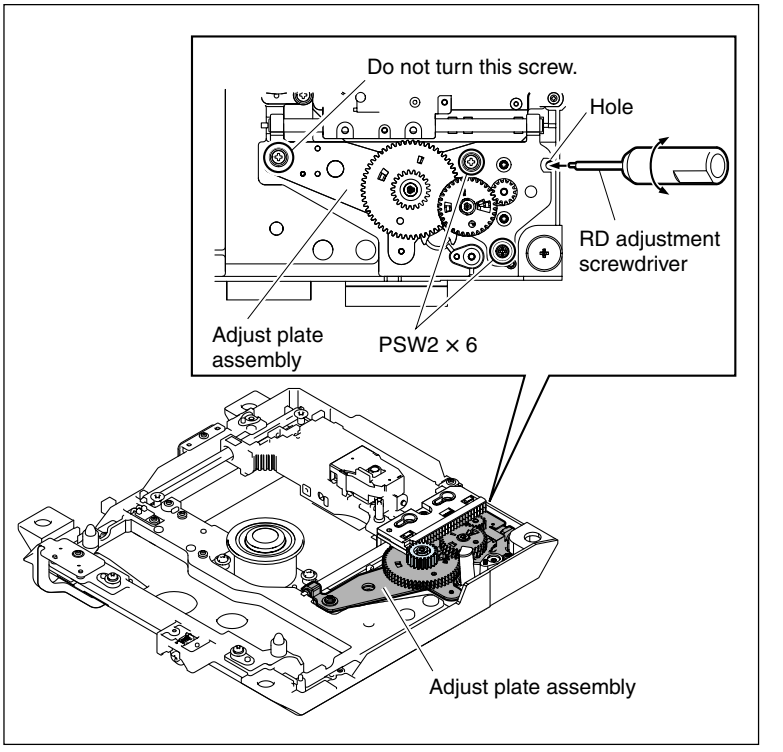


7. Select MECHA RD of the drive maintenance menu, and move the optical block assembly toward “OUT” using the menu.
   (Refer to Section 7-1-1.)
8. Confirm that the vertical amplitude at the center of the horizontal amplitude satisfies the specification.
   If the specification is not satisfied, perform step 9.
9. Insert the RD adjustment screwdriver into the hole of the adjust plate assembly shown in the figure to adjust the position so that the lissajous waveforms of “IN” and “OUT” satisfy the specifications.
10. Turn off the power and confirm that the disc in the cartridge stops completely.
11. Tighten the two screws securing the adjust plate assembly shown in the figure with the following tightening torque, and apply the locking compound to them.
    Tightening torque: $20 \times 10^{-2} \pm 0.01$ N•m
    {2.0 ±0.1 kgf•cm}

    Note

    Do not tighten the screws shown in the figure.

12. Perform the skew adjustment to confirm that the specification is satisfied.
    (Refer to Section 7-1-4.)
    If not, fine adjust the skew.
    (Refer to Section 7-1-4.)

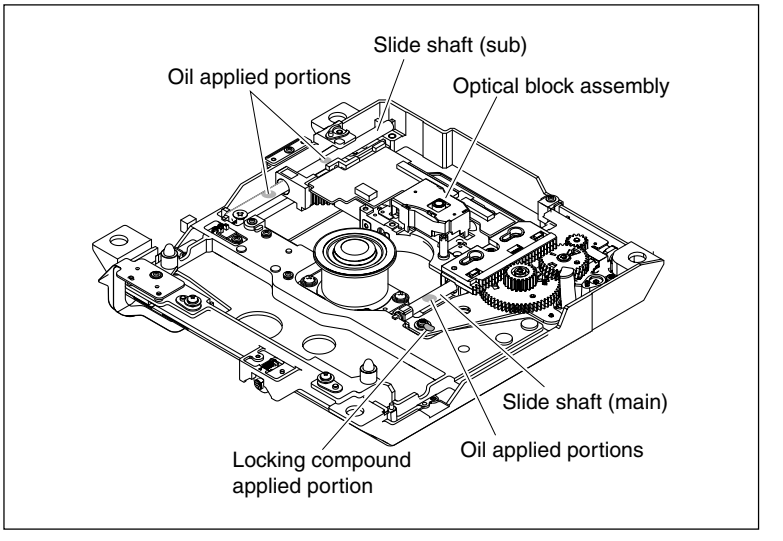


Apply locking compound and oil

1. Apply the locking compound to the screws shown in the figure. Also apply the oil to the three portions of the two slide shafts shown in the figure.

   Note

   Apply the locking compound to the screw as shown in the figure, being careful not to put it over the head of the screw.



Cleaning

1. Clean the loader (P1) assembly.
   (Refer to Section 5-2-2.)

Servo2 Automatic Adjustment

1. Remove the drive unit.
   (Refer to Section 6-17-4.)
2. Attach the loader (P1) assembly.
   (Refer to Section 6-5.)
3. Reinstall the drive unit.
   (Refer to Section 6-17-4.)
4. Turn on the power.
5. Select SERVO_2 of the drive maintenance menu, and perform the servo 2 auto-adjustment. (Refer to Section 4-4-21.)

Clear media log

1. Select CLEAR MEDIA LOG of the drive maintenance menu to clear media log.
   (Refer to Section 4-4-26.)
2. Turn off the power.

After Adjustment

1. Remove the drive unit.
   (Refer to Section 6-17-4.)
2. Reinstall the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
3. Reinstall the drive unit.
   (Refer to Section 6-17-4.)
4. Reinstall the top panel.
   (Refer to Section 1-9-1.)

7-1-4. Skew Adjustment

Notes

- To prevent the possibility of damage to the optical block assembly in the drive by static electricity charged in a human body or clothes, be sure to establish a ground before cleaning the drive assembly. (Refer to Section 1-20.)
- The spindle motor and the actuator around the objective lens have intense magnetic circuits. Keep magnetic substance away from these parts. If the magnetic force makes a metallic material such as a screwdriver, reflection block and so on hit the actuator, the objective lens will be damaged. If the magnetic substance is moved close to these parts, their characteristics may be changed.

The skew adjustment has the following two items:

- Skew check
- Skew adjustment

This section describes the skew check/adjustment procedures to be performed individually when the error rate becomes high.

Fixtures

- BRD-P1/P2 reflection block for auto-collimator (PW-003)
- Triangle plates IN/OUT (PW-001)
- Calibration plate
- Auto-collimator (Nikon 6D)
- Torque driver (For 3 kg)
- Bit for torque driver (M2)
- Hexagonal wrench driver
- Cleaning liquid
- Cleaning cloth
- Oil (LX-206)
- Locking compound

Skew Check

Preparations Before Check:

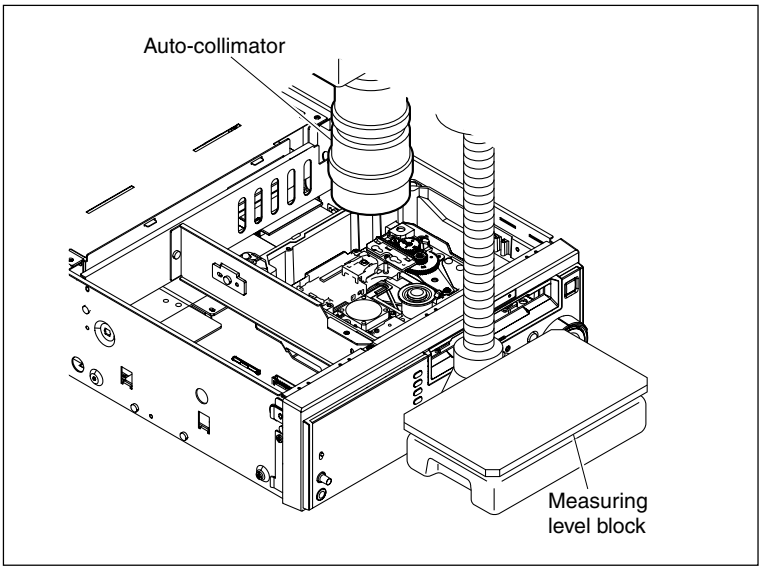
- Perform the dioptric adjustment and the crosshairs focus adjustment for the auto-collimator. Refer to the operation manual of the auto-collimator for details.
- Prepare the optical block assembly with the loader (P1) assembly unattached.
- Calibrate the triangle plates. (Refer to Section 7-1-2.)

Check Procedure

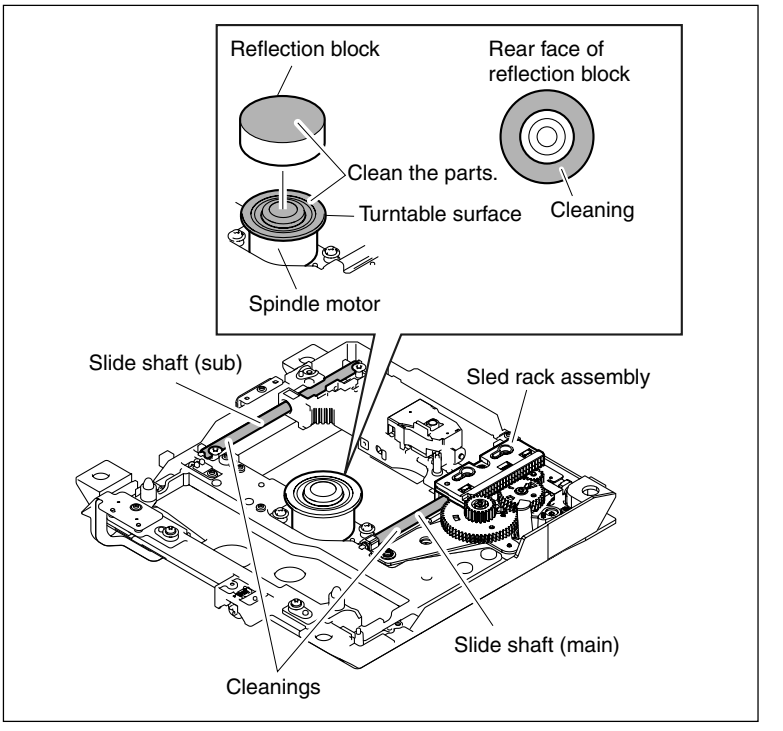
1. Put the unit beside the auto-collimator in the orientation shown in the figure.

   Notes

   - The specifications (α and β) described in the following are the values when the unit is placed as shown in the figure.
   - Make the skew adjustment on a stable workbench.



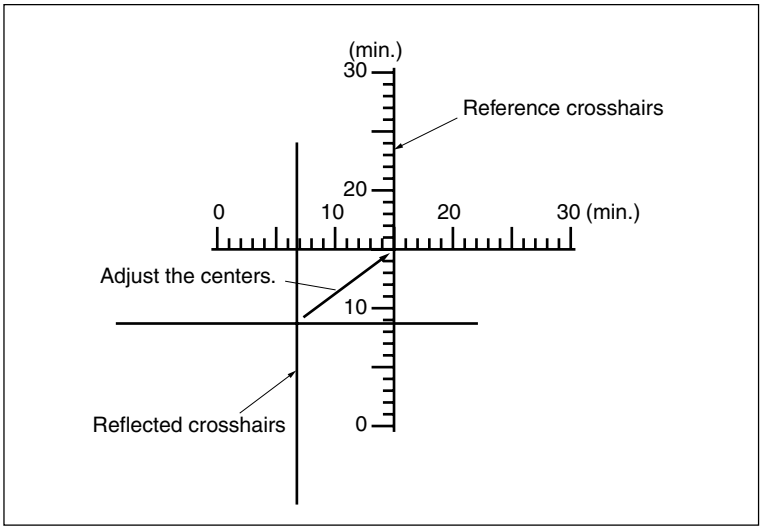
2. Clean the turn table of the spindle motor of the unit using the cleaning cloth with the cleaning liquid soaked.
3. While holding the sled rack assembly and moving the optical block assembly inward and outward, clean the slide shaft.
4. Put the cleaned reflection block on the turn table of the spindle motor.



5. Adjust the position and skew of the unit so that the reflected crosshairs (crosshairs reflected by the reflection block) becomes visible through the eyepiece of the auto-collimator.

   Note

   Put several pieces of paper between the unit and the workbench. Adjust the skew of the unit so that the paper is not slipped.



6. When the reflected crosshairs become visible, turn the X-Y direction adjustment handle of the auto-collimator to match the center of the reflected crosshairs and the center of the reference crosshairs (crosshairs on the eyepiece).

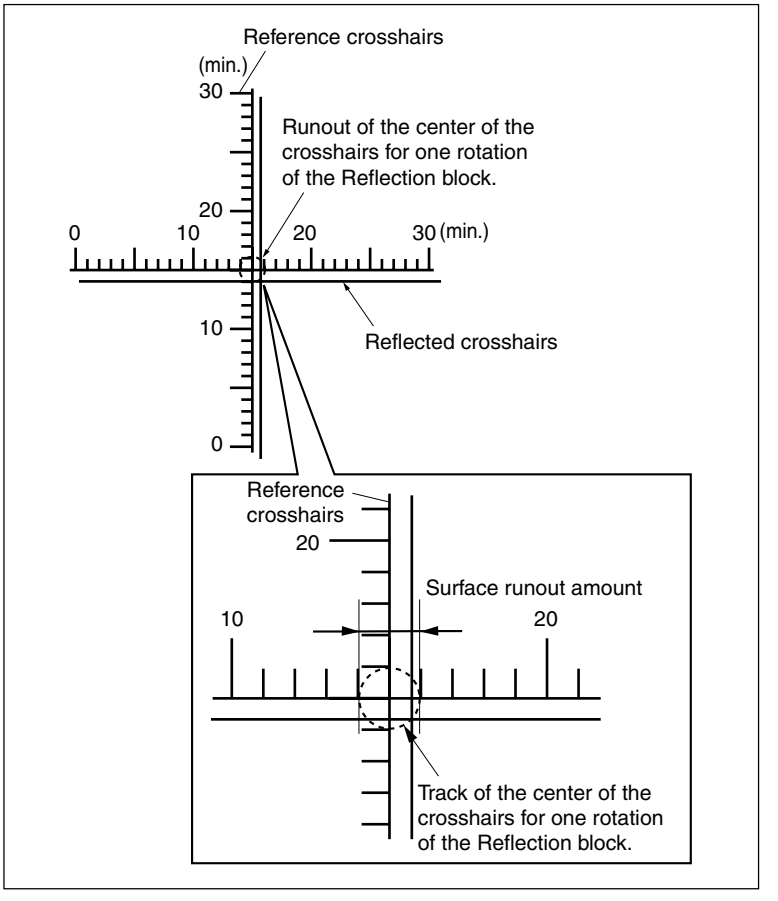
7. Turn slowly the reflection block on the spindle motor 360 degrees with fingers to check through the eyepiece that the surface runout amount of the center of the reflected crosshairs satisfies the specification.

   Specification

   Surface runout amount:
   3.5 minutes or less (3.5 tick marks or less on the reference crosshairs of the eyepiece)

   Note

   If the specification is not satisfied, clean the turn table of the spindle motor again and recheck the value.

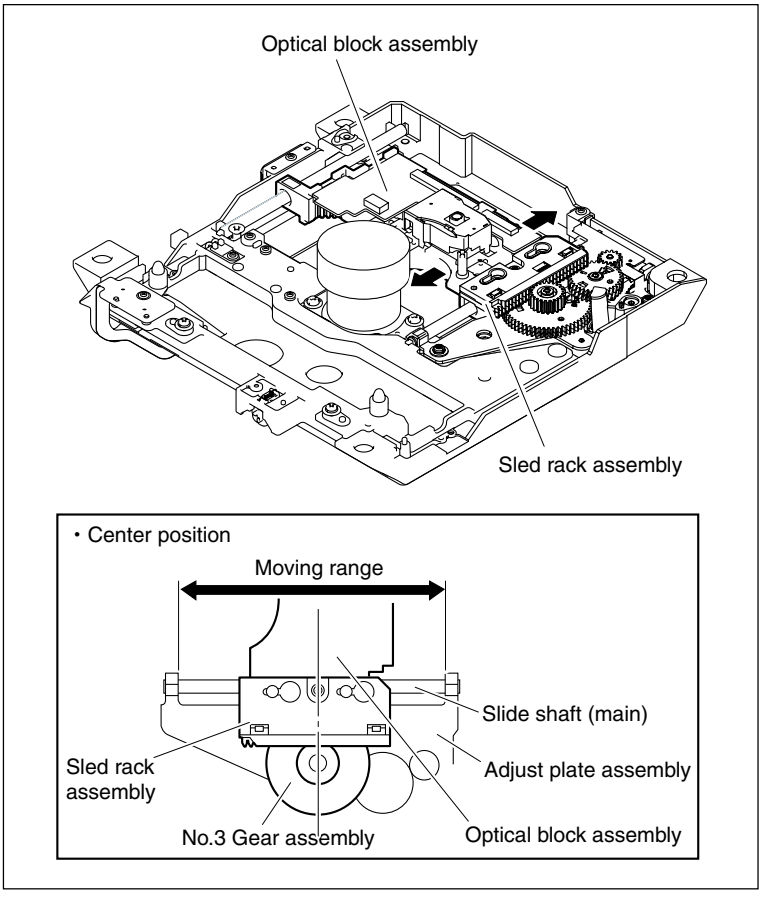


8. Adjust the center of the runout width of the reflected crosshairs and the center of the reference crosshairs again, using the X-Y direction adjustment handle.

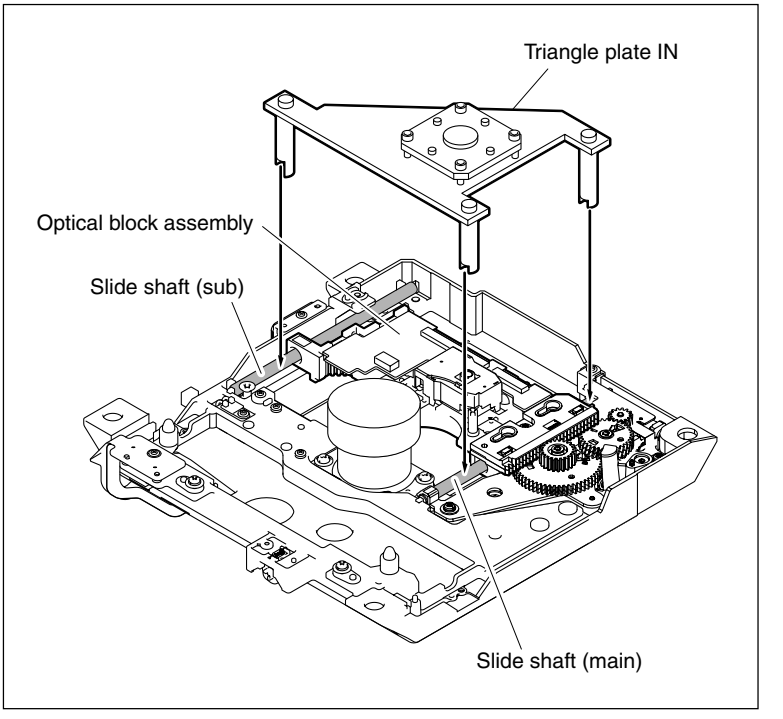
   Note

   Be sure not to change the position and the skew of the unit and not to touch the X-Y direction adjustment handle of the auto-collimator until the skew adjustment is completed.

9. Hold the sled rack assembly to move the optical block assembly to the center of the moving range.



10. Set the triangle plate IN, whose legs have been cleaned, in the orientation shown in the figure.

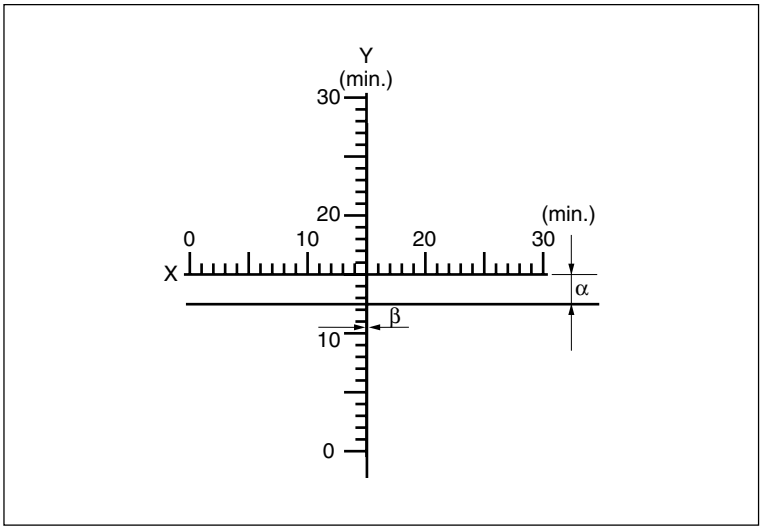


11. Confirm that the deviation amounts (α and β in the figure) between the center of the crosshairs reflected by the triangle plate IN and the center of the surface runout of the crosshairs reflected by the reflection block satisfy the specifications. Also measure the deviation direction and amount, and take notes of them.

    Specifications:

    α = ±1.00 min. or less (±1 tick mark or less on the reference crosshairs of the eyepiece)

    β = ±5.00 min. or less (±5 tick marks or less on the reference crosshairs of the eyepiece)



12. Remove the triangle plate IN, and place the triangle plate OUT whose legs are cleaned to the position shown in the figure.
13. Confirm that the deviation amounts (α and β in the figure) between the center of the crosshairs reflected by the triangle plate OUT and the center of the surface runout of the crosshairs reflected by the reflection block satisfy the specifications. Also measure the deviation direction and amount, and take notes of them.

    Specifications:

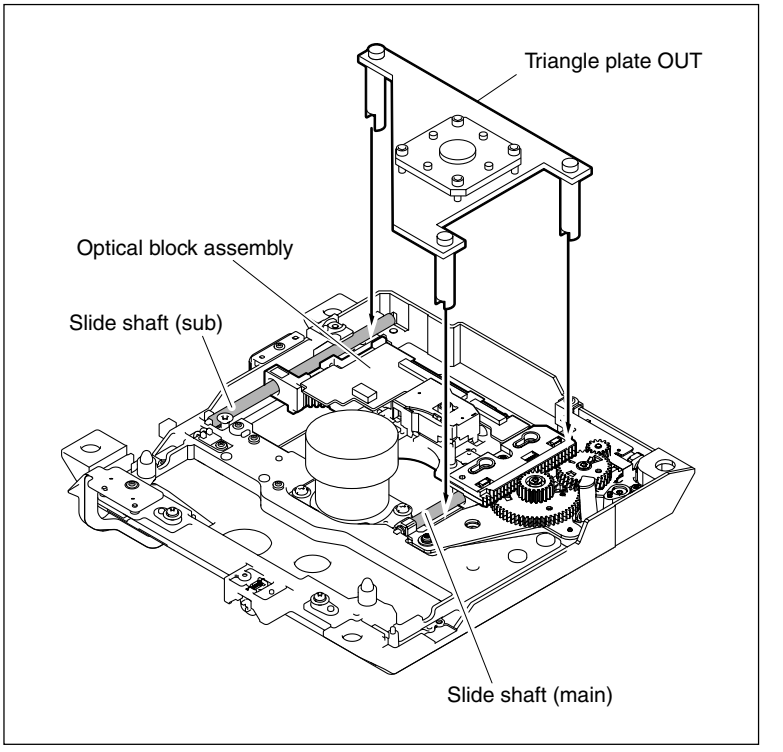
    α = ±1.00 min. or less (±1 tick mark or less on the reference crosshairs of the eyepiece)

    β = ±5.00 min. or less (±5 tick marks or less on the reference crosshairs of the eyepiece)

    If the specifications are not satisfied, perform the following skew adjustment.

    Note

    The deviations of IN and OUT should be in the same direction.



14. Perform the After Check/Adjustment. (Refer to page 7-22.)

Skew Adjustment

Preparations Before Adjustment:

Refer to “Preparations Before Checks” in “Skew Adjustment”.

Adjustment Procedure:

1. Perform steps 1 to 10 of the skew check.
2. Adjust by turning the radial skew adjustment screw and the tangential skew adjustment screw through the auto-collimator so that the center of the crosshairs reflected by the triangle plate IN and the center of the surface runout of the crosshairs reflected by the reflection block satisfy the specifications.

   Specifications:

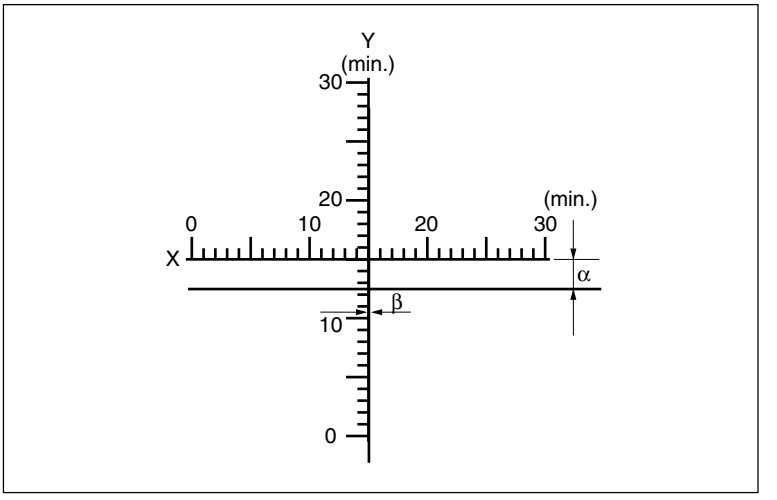
   $\alpha = \pm 1.00$ min or less (± 1 tick mark or less of the reference crosshairs on the eyepiece)

   $\beta = \pm 1.00$ min or less (± 1 tick mark or less of the reference crosshairs on the eyepiece)

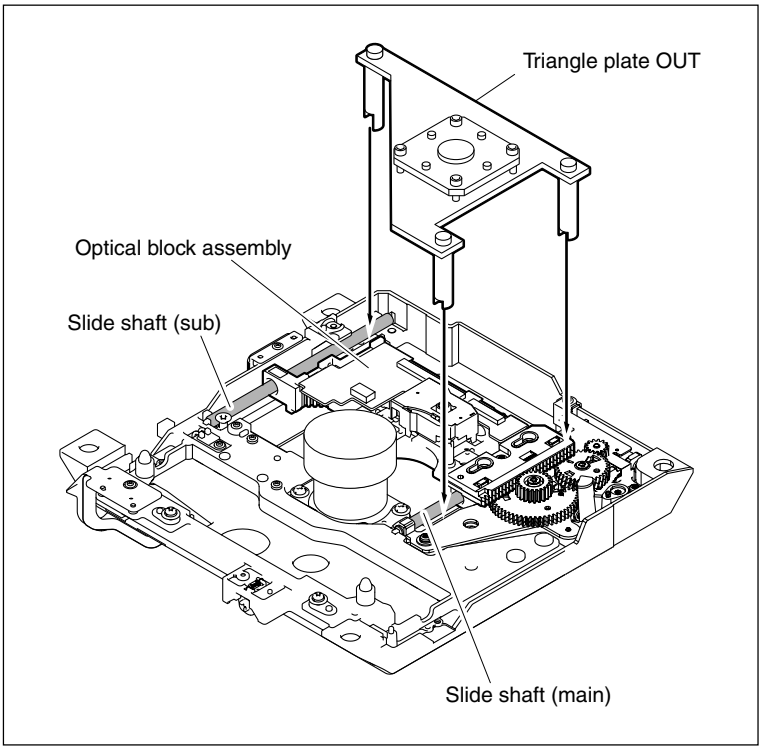
   Note

   Radial skew: Skew in the direction of movement of the optical block assembly

   Tangential skew: Skew perpendicular to the radial skew



3. Remove the triangle plate IN. Place the triangle plate OUT whose legs are cleaned to the position shown in the figure.



4. Adjust by turning the radial skew adjustment screw through the auto-collimator so that the radial skew (α) of the crosshairs reflected by the triangle plate OUT overlaps the Y axis that is the center of the surface runout of the crosshairs reflected by the reflection block. Measure the deviation amount (β) and the direction of the tangential skew, and take notes of them.
5. Remove the triangle plate OUT, and place the triangle plate IN whose legs are cleaned to the position shown in the figure.
6. Adjust by turning the tangential skew adjustment screw through the auto-collimator so that the center of the crosshairs reflected by the triangle plate IN and the center of the surface runout of the crosshairs reflected by the reflection block becomes the same deviation (β) direction and amount as those measured in step 4. If the crosshairs is deviated in the X-axis direction, fine adjust it using the radial skew adjustment screw so that the radial skew (α) and the tangential skew (β) satisfy the specifications.

   Specifications:

   α = ±1.00 min or less (±1 tick mark or less of the reference crosshairs on the eyepiece)

   β = ±5.00 min or less (±5 tick marks or less of the reference crosshairs on the eyepiece)

   Notes

   - Adjust both the adjustment screws equally.
   - The adjustment screws should be turned clockwise for this adjustment. If they are turned excessively, turn them back sufficiently, and turn them clockwise again.
   - The deviations of IN and OUT should be in the same direction.

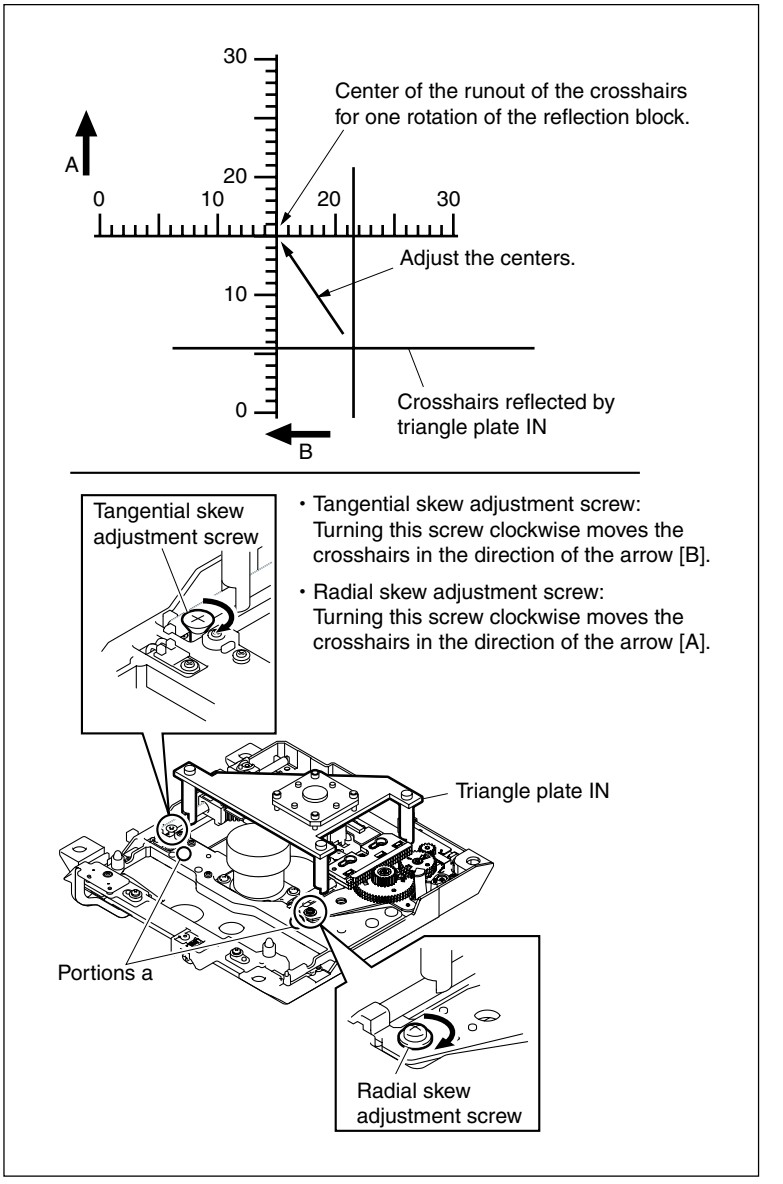
7. Tap around portions a of the base plate with the tip of a screwdriver, to check that the radial skew (α) and tangential skew (β) satisfy the specifications.

   If they do not satisfy the specifications, return to step 2 to perform the adjustments again.

   Specifications:

   α = ±1.00 min or less (±1 tick mark or less of the reference crosshairs on the eyepiece)

   β = ±5.00 min or less (±5 tick marks or less of the reference crosshairs on the eyepiece)


30
20
10
0
A
B
0
10
20
30
Center of the runout of the crosshairs for one rotation of the reflection block.
Adjust the centers.
Crosshairs reflected by triangle plate IN
Tangential skew adjustment screw
• Tangential skew adjustment screw: Turning this screw clockwise moves the crosshairs in the direction of the arrow [B].
• Radial skew adjustment screw: Turning this screw clockwise moves the crosshairs in the direction of the arrow [A].
Triangle plate IN
Portions a
Radial skew adjustment screw

8. Remove the triangle plate IN. Place the triangle plate OUT again to confirm that the specification is satisfied.

   Note

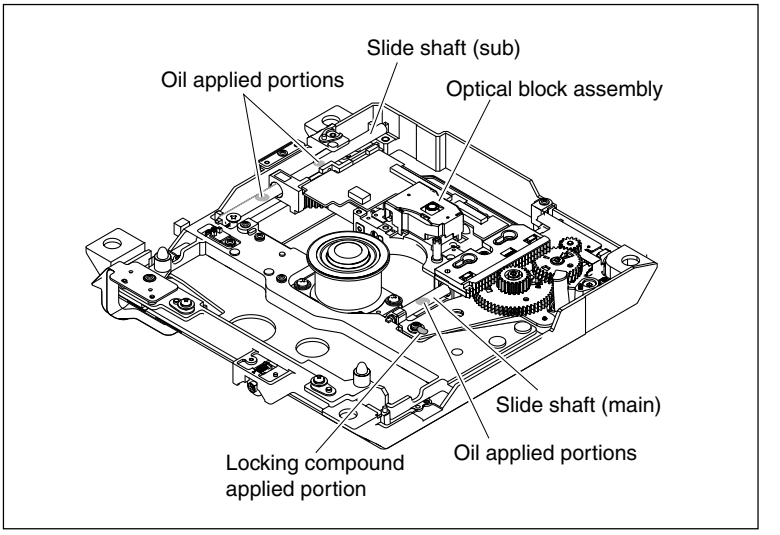
   The deviations of IN and OUT should be in the same direction.

After Check/Adjustment

1. After the specifications for the skew check are satisfied, apply oil to the three portions, shown in the figure, on the two slide shafts of the optical block.
2. When the adjustment are performed, apply locking compound to the screw shown in the figure, and also apply oil to the three portions shown in the figure on the two slide shafts.

   Notes

   - Apply the locking compound as shown in the figure. Be careful not to apply it over the screw.
   - Be careful about the amount of the oil not to be dropped from the slide shafts.



3. Remove the drive unit.
   (Refer to Section 6-17-4.)
4. Reinstall the loader (P1) assembly.
   (Refer to Section 6-5.)
5. Reinstall the drive unit.
   (Refer to Section 6-17-4.)
6. Reinstall the upper lid assembly and shutter assembly. (Refer to Section 6-3.)
7. Reinstall the top panel.
   (Refer to Section 1-9-1.)

7-1-5. RD Adjustment

The RD adjustment has the following two items:

- RD check
- RD adjustment

This section describes the RD check/adjustment procedures to be performed individually when the error rate becomes high.

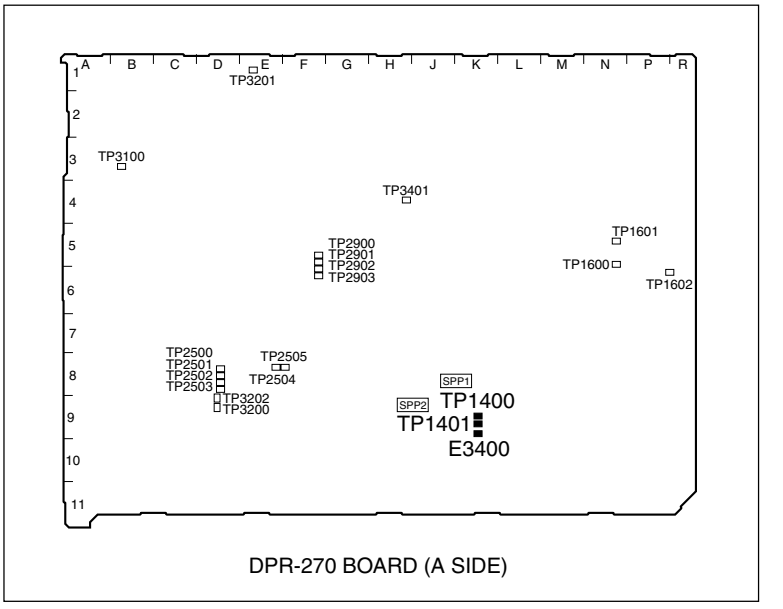
Fixtures

- RD adjustment screwdriver (PW-005)
- KES-110A E&F LPF box
- 2-channel oscilloscope
- Alignment disc (PFD23-RS)
- Regulated power supply
- Locking compound

RD Check

Preparations Before Check

- Input the voltages from the regulated power supply to the connector of the power cable supplied with the KES-110A E&F LPF box as follows.
  1pin: +12 V
  2pin: GND
  3pin: −12 V
- Connect the KES-110A E&F LPF box to the following connectors on the unit.
  TP1400/DPR-270 board
  TP1401/DPR-270 board
  E3400/DPR-270 board



DPR-270 BOARD (A SIDE)

- Connect CH-1 and CH-2 on the oscilloscope to the following connectors.
  CH-1: SPP1/KES-110A E&F LPF box
  CH-2: SPP2/KES-110A E&F LPF box
- Remove the loader (P1) assembly.
  (Refer to Sectin 6-5.)
- Open the cartridge shutter of the alignment disc using the following procedure.
  Be sure to close it after the check/adjustment.

Note

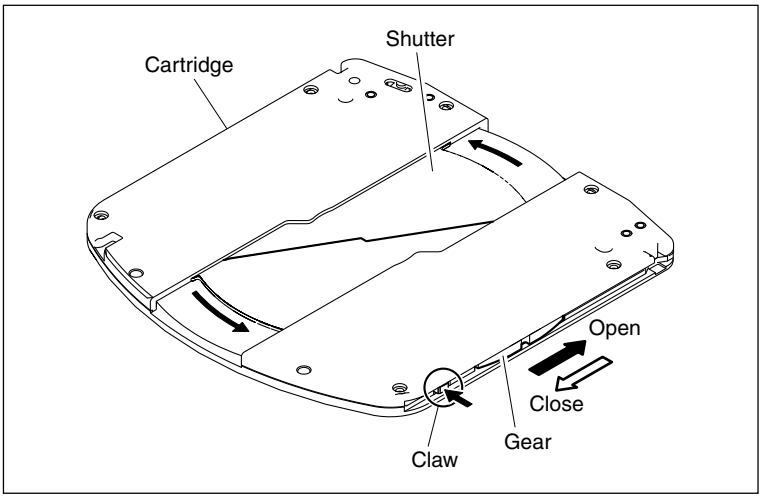
Opening the shutter of the cartridge by hand is limited to the RD check and adjustment.
Be sure not to open it for any other purpose. Do not touch the disc in the cartridge.

How to Open

Move the cover in the direction of the arrow while pressing the claw. Then move the gear by hand until the shutter is completely opened.

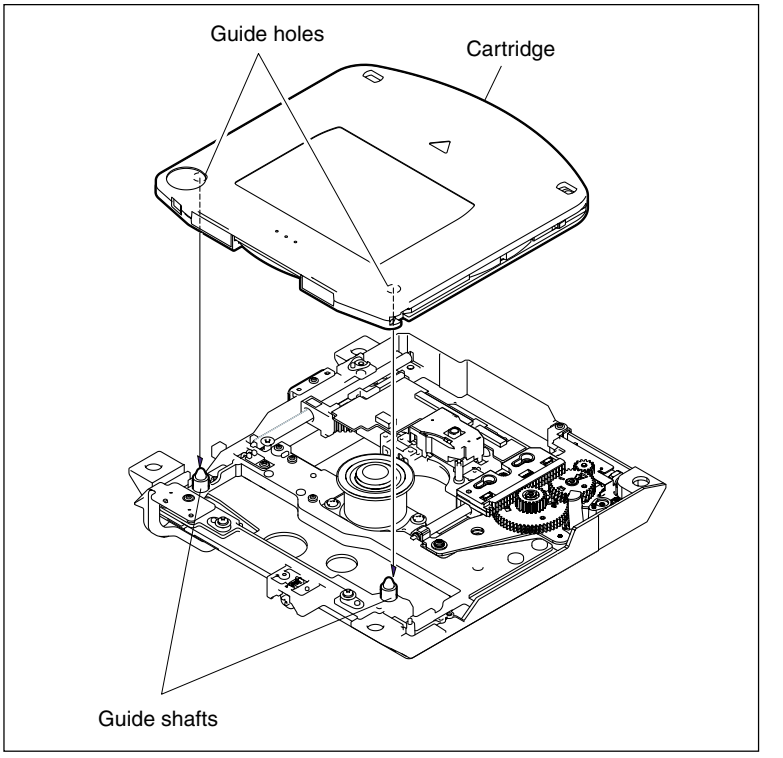
How to Close

Move the gear and the cover in the direction of the arrow until the shutter is closed and the claw snaps.

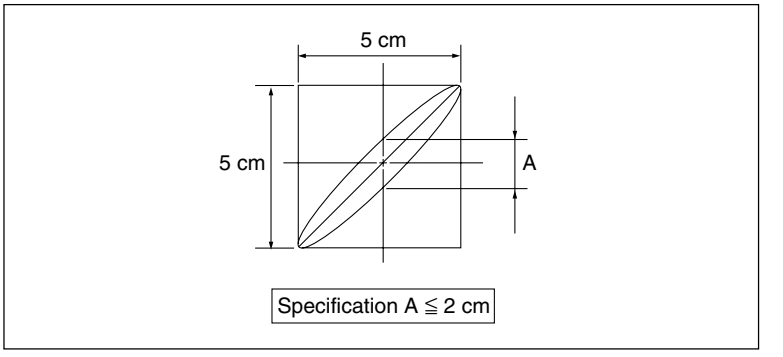


Check Procedure

1. Set the cartridge with its shutter opened on the base plate so that its guide holes are aligned with the two guide shafts of the base plate.



2. Turn on the power.
3. Select MECHA RD of the drive maintenance menu, and move the optical block assembly toward “IN” using the menu.
   (Refer to Section 7-1-1.)
4. Display a lissajous waveform to make the amplitude of the horizontal and vertical directions 5 cm each.
5. Confirm that the lissajous waveform is upward.
6. Confirm that the vertical amplitude at the center of the horizontal amplitude satisfies the specification.
   If the specification is not satisfied, perform the following RD adjustment.
7. Select MECHA RD of the drive maintenance menu, and move the optical block assembly toward “OUT” using the menu.
   (Refer to Section 7-1-1.)
8. Confirm that the vertical amplitude at the center of the horizontal amplitude satisfies the specification.
   If the specification is not satisfied, perform the following RD adjustment.
9. Turn off the power, and check the skew to confirm that the specification is satisfied.
   (Refer to Section 7-1-4.)
   If not, perform the skew adjustment.
   (Refer to Section 7-1-4.)



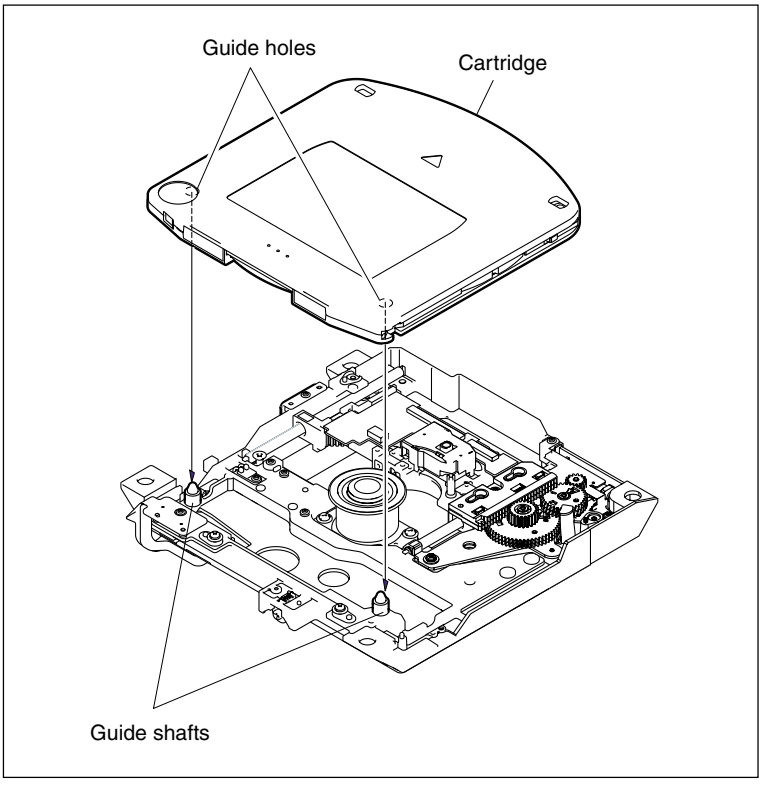
RD Adjustment

Preparations Before Adjustment:

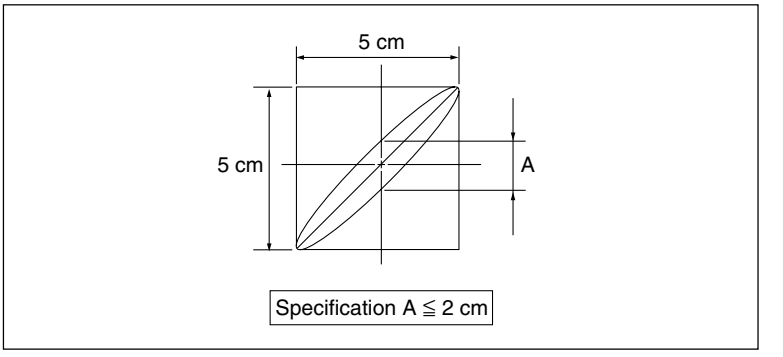
Perform “Preparations Before Check” of “RD Check”.

Adjustment Procedure

1. Melt locking compound for the screw shown in the figure.
2. Set the cartridge with its shutter opened on the base plate so that its guide holes are aligned with the two guide shafts of the base plate.



3. Turn on the power.
4. Select MECHA RD of the drive maintenance menu, and move the optical block assembly toward “IN” using the menu.
   (Refer to Section 7-1-1.)
5. Display a lissajous waveform to make the amplitude of the horizontal and vertical directions 5 cm each.
6. Confirm that the lissajous waveform is upward.
7. Confirm that the vertical amplitude at the center of the horizontal amplitude satisfies the specification.
   If the specification is not satisfied, perform steps 10 to 12.



8. Select MECHA RD of the drive maintenance menu, and move the optical block assembly toward “OUT” using the menu.
   (Refer to Section 7-1-1.)
9. Confirm that the vertical amplitude at the center of the horizontal amplitude satisfies the specification.
   If the specification is not satisfied, perform steps 10 to 12.
10. Turn off the power and confirm that the disc in the cartridge stops completely.
11. Remove the cartridge, and then loosen the two screws on the adjust plate assembly, and tighten temporarily the screws until the spring washers on the adjust plate assembly crushed lightly.
12. Turn on the power.
13. Set the cartridge with its shutter opened on the base plate so that its guide holes are aligned with the two guide shafts of the base plate.
14. Insert the RD adjustment screwdriver into the hole of the adjust plate assembly shown in the figure to adjust the position so that the lissajous waveforms of “IN” and “OUT” satisfy the specifications.

    Note

    Do not turn the RD adjustment screwdriver 360 degrees or more, or the optical block assembly may not move due to misalignment.

15. Turn off the power and confirm that the disc in the cartridge stops completely.
16. Remove the cartridge, and tighten the two screws securing the adjust plate assembly shown in the figure with the following tightening torque.

    Tightening torque: $20 \times 10^{-2} \pm 0.01$ N•m
    {2.0 ±0.1 kgf•cm}

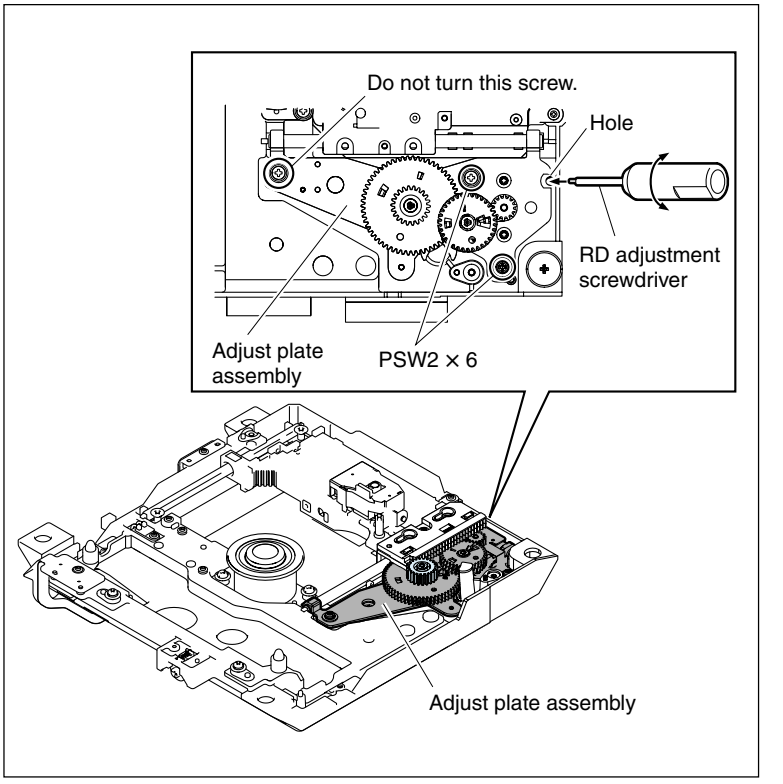
    Note

    Do not tighten the screws shown in the figure.

17. Apply locking compound to the screw shown in the figure.

    Note

    Be careful not to apply it over the screw.



After Adjustment

1. Remove the drive unit.
   (Refer to Section 6-17-4.)
2. Reinstall the loader (P1) assembly.
   (Refer to Section 6-5.)
3. Reinstall the drive unit.
   (Refer to Section 6-17-4.)
4. Reinstall the upper lid assembly and the shutter assembly. (Refer to Section 6-3.)
5. Reinstall the top panel. (Refer to Section 1-9-1.)

Section 8
Electrical Alignment

8-1. Electrical Alignment Overview

8-1-1. Precautions

- Be sure to perform each adjustment in order unless any instructions are provided.
- The adjustments of Section 8-3, and 8-4 are required for PDW-F70/70MD only.
- Do not execute adjustment item of the maintenance menu, and do not change adjustment data when other than required.
  In case either of these is done unintentionally, do not save the data.
  To recover it, turn off the power of the unit.
- Before beginning adjustment, it is recommended to make a copy of setup menu conditions.
  The settings can be returned easily to its customer condition after finishing adjustment.
  (Refer to Section 4-3.)

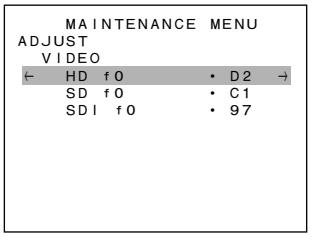
8-1-2. Tools/Fixtures

- Oscilloscope: TEKTRONIX TDS460A or equivalent
- Frequency counter: ADVANTEST TR5821 or equivalent

8-1-3. Displaying the Adjustment Item

Perform the electrical alignment using the adjustment menu of the maintenance mode.
Display the adjustment item as follows.

1. Display the maintenance menu. (Refer to Section 4-1.)
2. Select “ADJUST” using the [↓] button, and press the [→] button.
3. Press the [→] button.
   The adjustment item appears.



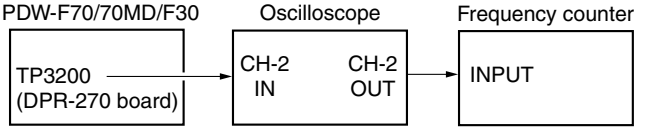
8-2. HD Free-Running Frequency Adjustment

Tools/Fixtures

- Oscilloscope: TEKTRONIX TDS460A or equivalent
- Frequency counter: ADVANTEST TR5821 or equivalent

Preparations

1. Turn the unit power off.
2. Remove the top panel. (Refer to Section 1-9-1.)
   When the option PDBK-101 is installed, remove it.
3. Connect the oscilloscope and the frequency counter to the unit.



Connection

4. Turn on the power of the unit and the tools.
   Note
   Apply power to the unit and the tools for 10 minutes or more to warm them up.

5. Set the system of the unit to 59.94i by performing the following steps (1) to (7).
   (1) Press the [MENU] button on the HOME menu to display the system menu.
   (2) Select “SETUP MENU” using the [↑]/[↓] buttons, and press the [→] button.
   (3) Select “OPERATIONAL FUNCTION” using the [↑]/[↓] buttons, and press the [→] button.
   (4) Select “SYSTEM SEL” using the [↓] button, and press the [→] button.
   (5) Select “SYSTEM FREQ” using the [↑]/[↓] buttons, and press the [→] button.
   (6) Select “60I (59.94i)” using the [↑]/[↓] buttons, and press the [SET] button.
   (7) Restart the unit.

HD Free-Running Frequency Adjustment

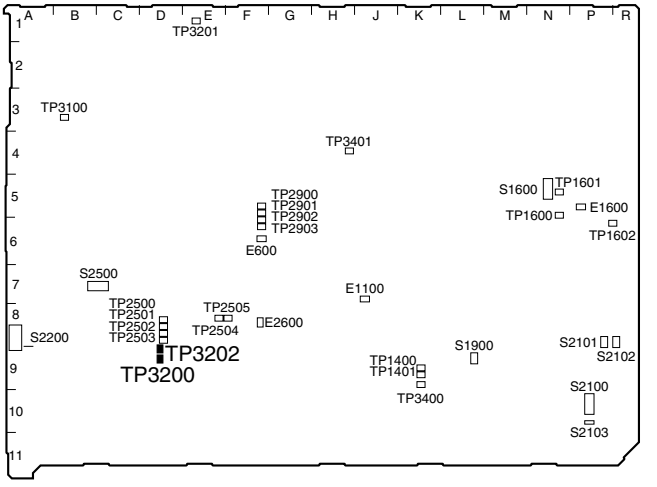
1. Set the oscilloscope as follows:
   CH-2: DC 2 V/DIV
   TIME: 100 µs/DIV
2. Display the adjustment item referring to Section 8-1-3.
3. Select "HD f0" using the [↑]/[↓] buttons, and press the [→] button.
   The HD VCO f0 ADJUST menu appears.

```
MAINTENANCE MENU

HD VCO f0 ADJUST
 preset : 80H

            D2 (HEX)


  INC/DEC :  JOG DIAL
DATA SAVE :   SET KEY
  TO MENU :  MENU KEY
```

4. Adjust so that the value on the frequency counter satisfies the specification by turning the JOG dial.
   Test Point: TP3200/DPR-270 (D-9)
   Specification: 74.1758 ±0.0001 MHz

5. Press the [SET] button to save the adjustment data.
6. Change "SYSTEM FREQ" to "50I (50i)" referring to step 5 of "Preparations".
7. Display the adjustment item referring to Section 8-1-3.
8. Select "HD f0" using the [↑]/[↓] buttons, and press the [→] button.
   The HD VCO f0 ADJUST menu appears.
9. Adjust so that the value on the frequency counter satisfies the specification by turning the JOG dial.
   Test Point: TP3200/DPR-270 (D-9)
   Specification: 74.2500 ±0.0001 MHz

10. Press the [SET] button to save the adjustment data.
11. Re-set "SYSTEM FREQ" to the customer setting referring to step 5 of "Preparations".



DPR-270 board (side A)

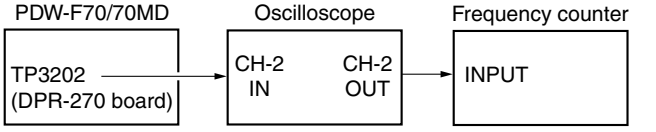
8-3. SD Free-Running Frequency Adjustment (PDW-F70/70MD only)

Tools/Fixtures

- Oscilloscope: TEKTRONIX TDS460A or equivalent
- Frequency counter: ADVANTEST TR5821 or equivalent

Preparations

1. Turn the unit power off.
2. Remove the top panel. (Refer to Section 1-9-1.)
   When the option PDBK-101 is installed, remove it.
3. Connect the oscilloscope and the frequency counter to the unit.



Connection

4. Turn on the power of the unit and the tools.
   Note
   Apply power to the unit and the tools for 10 minutes or more to warm them up.

SD Free-Running Frequency Adjustment

1. Set the oscilloscope as follows:
   CH-2: DC 2 V/DIV
   TIME: 100 µs/DIV
2. Display the adjustment item referring to Section 8-1-3.
3. Select "SD f0" using the [↓] button, and press the [→] button.
   The SD VCO f0 ADJUST menu appears.

```
MAINTENANCE MENU

SD VCO f0 ADJUST
 preset : 80H

            C1 (HEX)


  INC/DEC :  JOG DIAL
DATA SAVE :   SET KEY
  TO MENU :  MENU KEY
```

4. Adjust so that the value on the frequency counter satisfies the specification by turning the JOG dial.
   Test Point: TP3202/DPR-270 (D-8)
   Specification: 27.00000 ±0.00005 MHz

5. Press the [SET] button to save the adjustment data.

8-4. SDI ENC Free-Running Frequency Adjustment (PDW-F70/70MD only)

Preparations

Turn on the power of the unit.

Note

Apply power to the unit for 10 minutes or more to warm up.

SDI ENC Free-Running Frequency Adjustment

1. Display the adjustment item referring to Section 8-1-3.
2. Select “SDI f0” using the ↓ button, and press the → button.
   SDI ENC f0 ADJUST menu appears.

```
MAINTENANCE MENU

SDI ENC f0 ADJUST
 preset : 80H

          97 (HEX)


AUTO ADJ : SHIFT KEY
 INC/DEC :  JOG DIAL
DATA SAVE :   SET KEY
 TO MENU :  MENU KEY
```

3. Press the SHIFT button.
4. When the message “OK” is displayed, press the SET button to save the adjustment data.

```
MAINTENANCE MENU

SDI ENC f0 ADJUST
 preset : 80H

          97 (HEX)
          OK

AUTO ADJ : SHIFT KEY
 INC/DEC :  JOG DIAL
DATA SAVE :   SET KEY
 TO MENU :  MENU KEY
```

8-5. SDI DEC Free-Running Frequency Adjustment (PDBK-104 installed only)

Preparations

Turn on the power of the unit.

Note

Apply power to the unit for 10 minutes or more to warm up.

SDI DEC Free-Running Frequency Adjustment

1. Display the adjustment item referring to Section 8-1-3.
2. Select “SDI DEC f0” using the ↓ button, and press the → button.
   SDI DEC f0 ADJUST menu appears.

```
MAINTENANCE MENU

SDI DEC f0 ADJUST
 preset : 80H

          97 (HEX)


AUTO ADJ : SHIFT KEY
 INC/DEC :  JOG DIAL
DATA SAVE :   SET KEY
 TO MENU :  MENU KEY
```

3. Press the SHIFT button.
4. When the message “OK” is displayed, press the SET button to save the adjustment data.

```
MAINTENANCE MENU

SDI DEC f0 ADJUST
 preset : 80H

          97 (HEX)
          OK

AUTO ADJ : SHIFT KEY
 INC/DEC :  JOG DIAL
DATA SAVE :   SET KEY
 TO MENU :  MENU KEY
```

8-6. LCD VCO Adjustment

1. Turn on the power of the unit while pressing the PLAY and STOP buttons.
   The adjustment menu appears on the lower side of the LCD display.
2. Press the STOP button six times to display “7. LCD-NTSC ADJUSTMENT”.
3. Press the PLAY button.
   The adjustment item “VCO FINE xxx” appears.
4. Press the SET button with “VCO FINE xxx” displayed.
   Adjustment is executed automatically.
   When the adjustment is completed, the message “F0 ADJ. DONE” is displayed.
   Note
   There is no problem even if the image of LCD display is distorted during adjustment.

5. Press the PLAY button nine times to display “EE-PROM WRITE” of “7. LCD-NTSC ADJUSTMENT”.
6. Press the SET button to save the adjustment data.
   When the saving of adjustment data is completed, the message “WRITE COMPLETE” is displayed.
7. Press the STOP button three times to display “8. LCD-PAL ADJUSTMENT”.
8. Perform the same procedure as steps 3 to 6 for “8. LCD-PAL ADJUSTMENT”.
9. Turn the unit power off.

For PDW-F70/F30

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer :

Check the metal trim, “metallized” knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA. Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers’ instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The “limit” indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

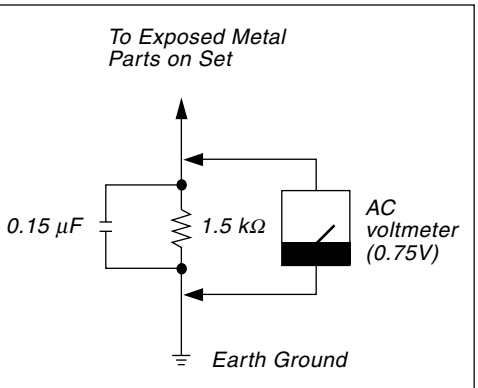


Fig A. Using an AC voltmeter to check AC leakage.

For PDW-70MD

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer :

Check the metal trim, “metallized” knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA. Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers’ instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The “limit” indication is 0.5 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. (See Fig. A)

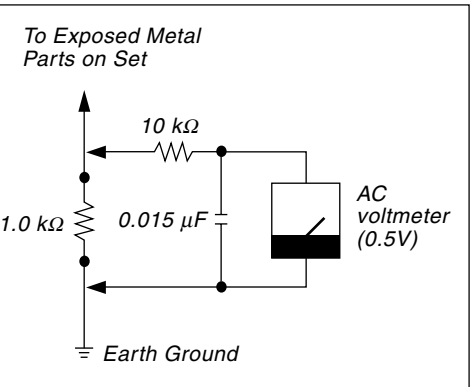


Fig A. Using an AC voltmeter to check AC leakage.

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PDW-F30 (SY, CN)
PDW-70MD (SY) E
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